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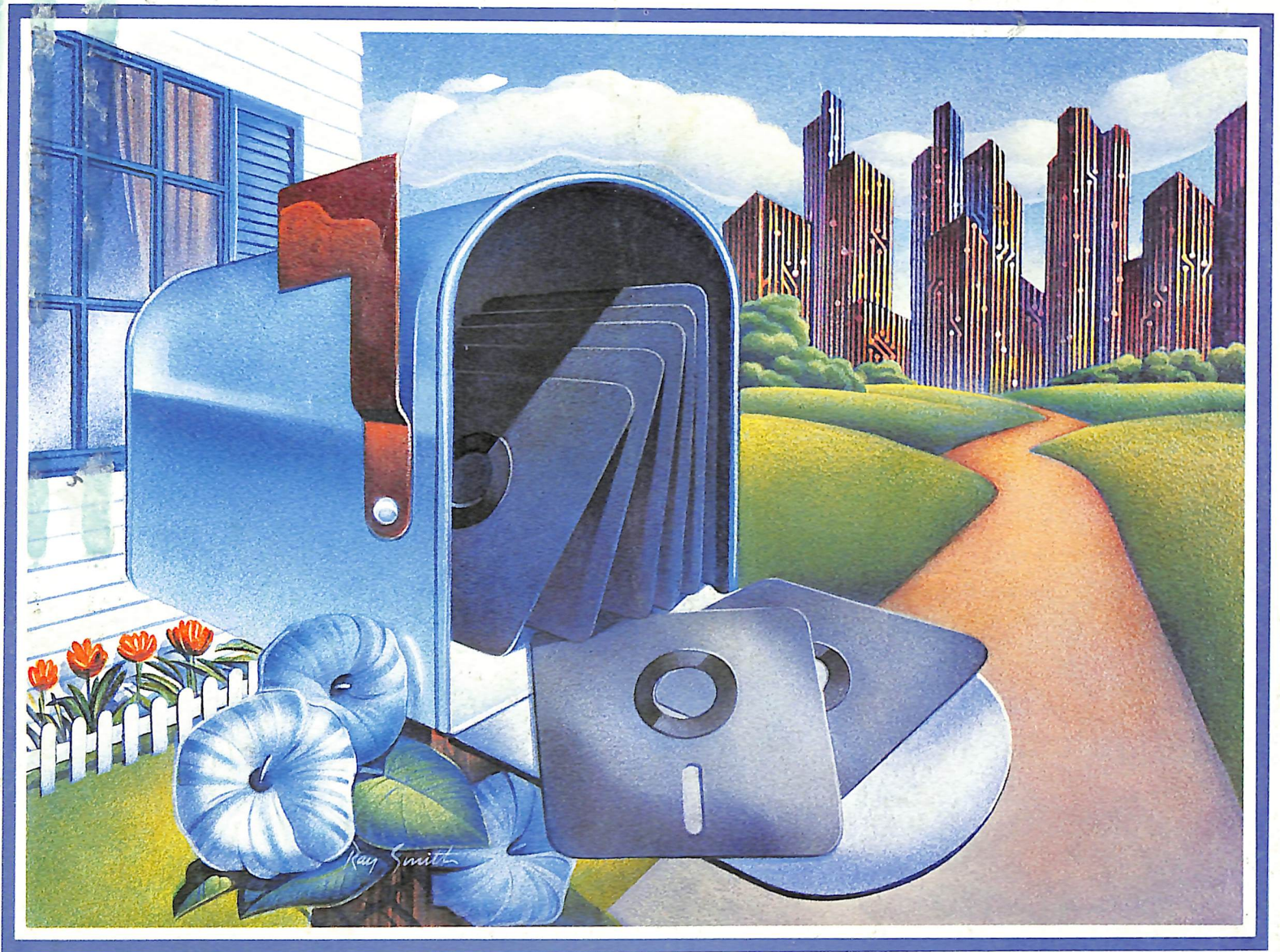
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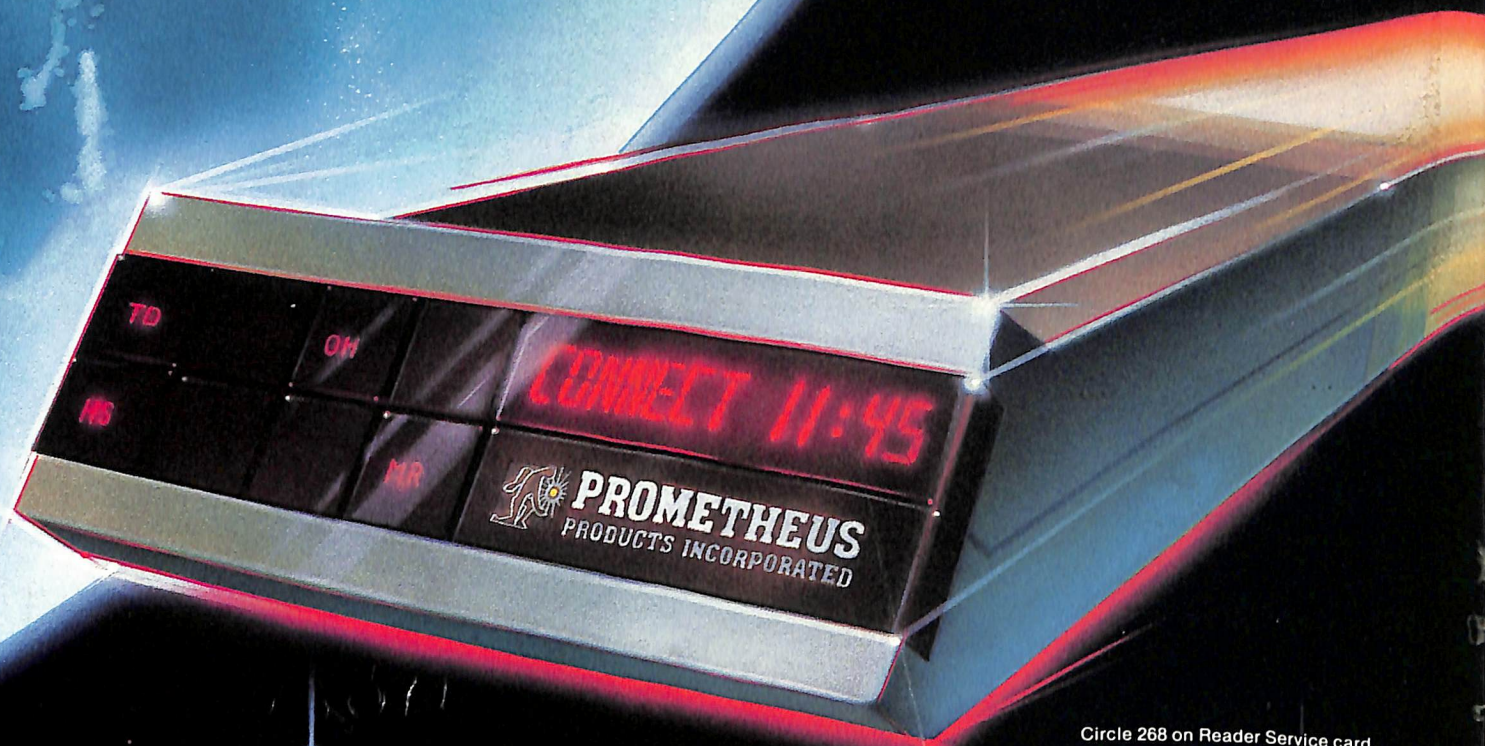
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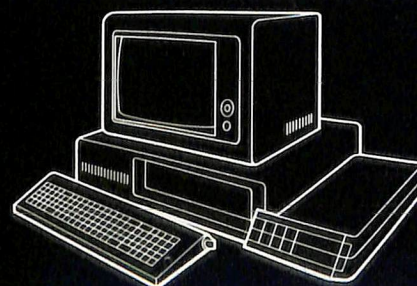
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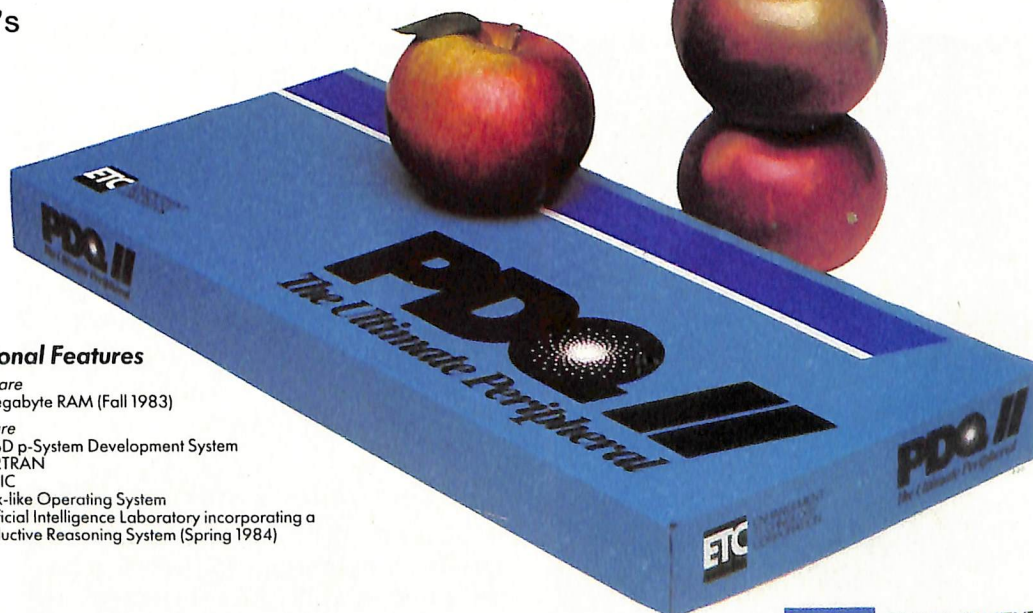
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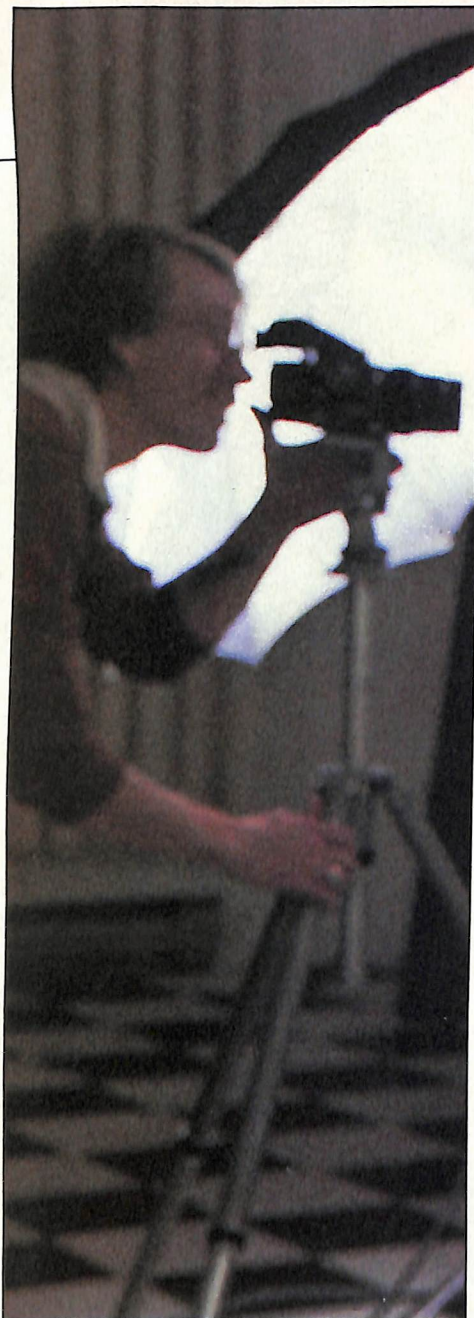


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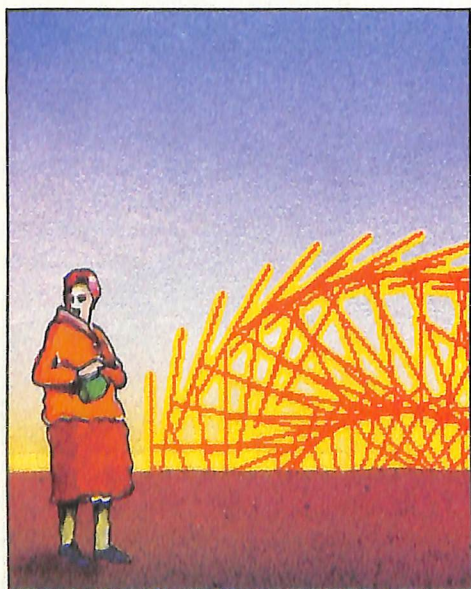
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- Software**
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 - Artificial Intelligence Laboratory incorporating a Deductive Reasoning System (Spring 1984)

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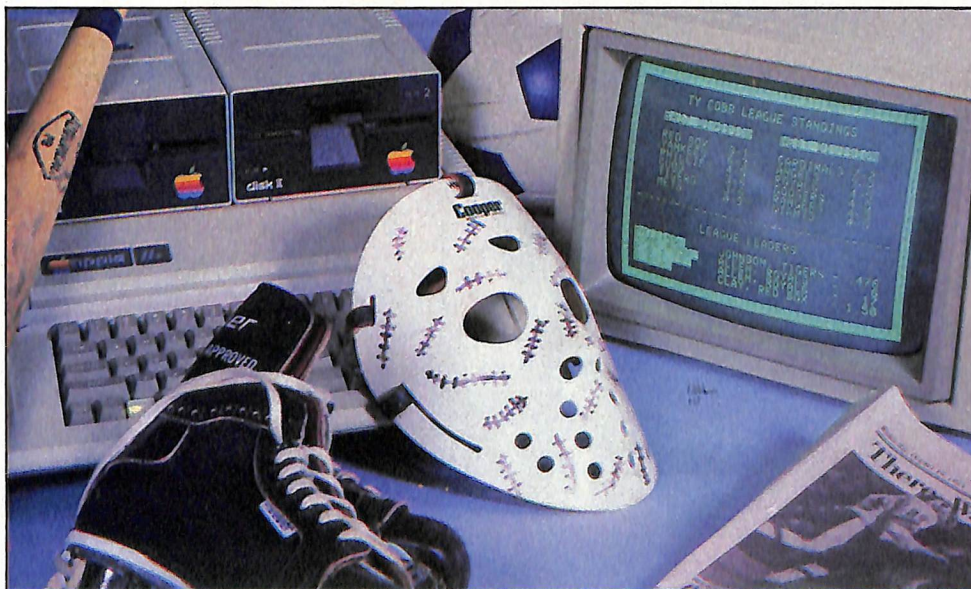
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Cover art by Ray Smith

inCider (ISSN #0740-0101) is published 12 times a year by Wayne Green Inc., 80 Pine St., Peterborough, NH 03458. Phone: 603-924-9471. Second class postage pending at Peterborough, NH, and additional mailing offices. Subscription rates in U.S. are \$25 for one year and \$53 for three years. In Canada and Mexico, \$27.97—one year only, U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), \$44.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail), please inquire. In South Africa contact *inCider*, PO Box 782815, Sandton, South Africa 2146. All U.S. and Canadian subscription correspondence should be addressed to *inCider*, Subscription Department, PO Box 911, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to *inCider*, Subscription Services, PO Box 911, Farmingdale, NY 11737. Entire contents copyright 1983 by Wayne Green Inc.



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When an airline gratuitously bans the use of the greatest executive travel aid yet invented it's time to fight back. I'm talking about the new kneetop computers that allow a businessman to sit on a plane and, without annoying the other passengers, do his work.

I was shocked and angry when I heard of the decision of Eastern Airlines to prohibit the use of my work station. I've used mine on dozens of flights since buying it last April. It's worked for me on the Concorde to London and back, on a recent trip around the world, and on innumerable flights within the U.S., all with no problems to anyone.

My kneetop computer lets me write editorials for my six monthly computer magazines and for my magazine for electronics hobbyists, 73. I use it to answer my mail, write memos, keep notes, have addresses and phone numbers handy and keep my appointment schedule. I'll be lost without it.

If there were any technical reasons for banning this type of portable computer, I wouldn't be so upset, but there have been no tests showing any potential for these kneetop computers to interfere with any of the plane's navigation or communications equipment.

Indeed, as an expert on both radio communications and computers and as an old pilot myself, I've tested my own kneetop computer most carefully and found it quite free from generating interference.

The FAA has also run careful tests—even to the point of holding a

computer right up against the plane's equipment. Nothing. The FAA says further that they have no reports of any interference from portable computers.

In the face of this evidence, there seems to be no good reason for the Eastern ban—so I'm banning Eastern from my travel plans and I'm taking airlines which will allow me to do my work. Further, I'm asking every reader to pass the word and help me fight back against Eastern and its decision. Let's boycott Eastern until it makes its skies friendlier for businesspeople.

You may not have discovered how much you can get done in between the snacks aloft when you answer mail instead of watching an old movie or just sitting there for several hours reading pap magazines. Unless you join me in fighting back at this gratuitous slap at business, you're going to have to continue to waste much of your flight time.

These kneetop computers beat the heck out of even the best of portable typewriters. The clicking from those can drive nearby passengers nuts. And when you are on a trip you can connect your kneetop computer to a telephone and send letters and information to and from your office—from all around the world.

Let's not take this reclining; let's let Eastern know how we feel. ■

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Microfilm: This publication is available in microform from University Microfilms International. United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.

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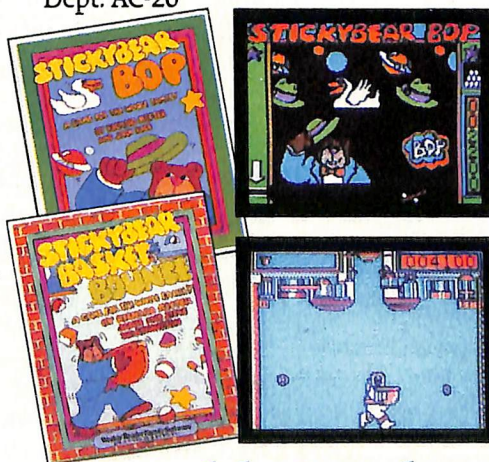
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Submissions: We're always looking for first-class manuscripts at *inCider*. If you have written a useful or entertaining program for the Apple, why not share it? Conversions of programs published in *80 Micro* or *Microcomputing* are also welcome. We'll consider publication of any material for the Apple. Guidelines for budding authors are available—just address an envelope to yourself and include it with your request.

Paramount among the Apple's virtues is its ability to transform its user's working environment. With an effective strategy, Apple owners can make their living wherever and whenever they choose. This month *inCider* takes a look inside the Apple cottage, and you'll find—as we did—that there can be more to life than a 9-to-5 grind.

Regular readers especially will enjoy Dan Bishop's tale of how he forsook a tenured college teaching position to inaugurate his own software business high in the Rocky Mountains. Today, the business keeps him in the chips, and permits him the freedom to double as *inCider's* Applesoft Adviser.

You'll enjoy descending into Archie Mason's "Data Basement," wherein Mason and family provide bookkeeping services for a myriad of clients—all of whom pay handsomely. Accompanying stories describe how Apples help organize sports leagues, calculate taxes and otherwise account for themselves.

Photographer Mike Brewer calls himself a "gear head," but he sells himself short; anyone who devises Apple applications like his is nothing short of ingenious! Trish McClelland returns to *inCider's* pages with her advice on how to become an affordable, respected microcomputer consultant. Dr. Nancy White Kelly also returns, explaining how she, her husband and two children built a prosperous Apple-based tutoring business.

Speaking of education, engineer J. Patrick Dougherty enlisted VisiCalc to help his wife manage an Omaha, Nebraska preschool. The applications Dougherty offers will benefit not only preschool owners, but administrators of many kinds.

New Mexican Paul Garrison wrote two articles for us this month. "Apples in Real Estate" presents two programs comprehensive enough to snatch prospective clients from the

monolithic brokerage firms. Immediately thereafter, Garrison extends a hand to the downtrodden professionals who need all the help they can get—full-time free-lance writers.

If you've been following Randy Hyde's "Assembly Advantage" tutorial this past year, you'll share our regret that Randy's series is now complete. In future articles he will explore some of his new and exciting projects. But *inCider* remains committed to helping our readers master the fine art of assembly-language programming. So stay tuned.

Meanwhile, *inCider* rolls out a new department—"New Publications." We believe you want to learn as much as you can about how best to use your Apple, and we're going to do our best to see that you do. And as a special feature, we present this month the *inCider* 1983 article index. After scanning it to find article titles that particularly interest you, you may want to contact our back issues department!

Education Editor Joan Witham and Editor-in-Chief Linda Stephenson represented *inCider* last October in Washington at the Presidential Awards for Excellence in Science and Mathematics Teaching. The people of *inCider* and Wayne Green Inc. are proud of America's science and math teachers, and to demonstrate our pride, we have presented to all 104 winners complimentary subscriptions to *inCider*. Congratulations, all!

To all the folks who dropped by *inCider's* booth at Applefest in San Francisco—thanks, it was great to meet you. Your kind comments and helpful suggestions will make the magazine even better. And your West Coast hospitality leaves me impatient to return. ■

—LS

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Fermentations

by Sam Whitmore
inCider staff

Sustaining Apple Software

Apple II owners may choose from more than 16,000 compatible software packages. If software sells the hardware, as many experts contend, it's no wonder Apple Computer is a billion-dollar company.

But despite its mighty installed base of nearly 1,500,000 units, Apple no longer monopolizes software writers' attention. Skyrocketing sales of the IBM Personal Computer and other 16-bit machines have lured software writers to first produce programs for that market, and then—if possible—for the Apple.

Says Alexander Stein, senior analyst for the research firm Dataquest Inc.: "Whereas two years ago 70 percent of software was written for Apple, about 70 percent now is written for the IBM PC and its compatibles."

For Apple owners, that's less ominous a statistic than it appears. "Certainly, a larger percent of software is being written for 16-bit machines than ever before, but I'm not sure Apple software is going down in terms of absolute numbers," says Robert Leff, President of Softsel Inc., the world's largest software distributor. "Remember, submissions are double what they were a year ago. The number of programs may have fallen off slightly, but not significantly."

Apple recognizes this trend, and to prove it, the company has tripled its fiscal 1984 advertising budget and has launched a comprehensive marketing campaign which depicts products from software giants like VisiCorp, Microsoft Inc. and Ashton-Tate with Apple IIs and Apple IIIs in display ads and in-store circulars.

"Apple has become a very marketing-oriented company," declares Carrie Lavine, Apple's Business Software Marketing Manager, "so for our new promotion, we selected key products and key vendors and invited them to position their products alongside us

as they normally would position them."

Apple's Sales Promotion Planner Kathryn Higa says the new promotion "will better target the Apple IIe customer. By spotlighting several of the top business programs," Higa says, "we'll be filling any gap between the traditionally best-selling Apple software and what the business community demands today."

Interestingly, Apple chose to co-advertise with Ashton-Tate, creators of the CP/M-based dBase II. "We have to recognize what's going on out there regarding MS-DOS," says Carrie Lavine. "Our strategy was to include products that business users are buying regardless of the machine—well, almost. In our implementation it just so happened that one of those products doesn't work in an Apple's native mode."

Software writers, says Dataquest's Stein, have good reason to favor MS-DOS, 16-bit technology. "The 16-bit machine offers a better clock rate, which allows the screen to change more quickly than with an 8-bit machine (as are the Apple IIs and Apple III). That doesn't make a difference for most applications, but it makes a big difference when using integrated software. The complexity of integrated software requires an extremely high clock rate, and only 16-bit machines provide it."

The news from Cupertino, however, is good. Apple's plans for an enhanced Apple IIe with a mouse and windowing capabilities will spawn both new software writing and the adaptation of popular older programs (thereby prolonging the product's life). Apple III Software Marketing Manager Linda Goffen touts several integrated software packages already available for the III; one forthcoming from Haba Systems, Goffen says, will provide "cut-



and-paste and three concurrent applications in RAM including word processing, which everyone these days seems to be looking for."

Meanwhile, more than 130 companies have begun writing software for Apple's own 16-bit baby, Lisa. Apple recently released the tentatively-titled "Lisa Tool Kit," which Lisa Division spokesperson Burt Cummings says "will allow packages written in Pascal, Basic, Cobol and so forth to run in a window on the Lisa desktop."

"The Lisa was always designed to be an open machine," Cummings says. "It took a few months to acquire third-party software only because we had to find out ourselves how it was done. With the knowledge we gained from creating our own integrated software, we're now conducting classes to help software writers with their Lisa programs."

Thus, the software writing community has every reason to renew its faith in Apple. "Sure, you're not going to see a 1-2-3 or a DesQ on an Apple—at least on an Apple IIe," declares Softsel President Robert Leff. "But Apple still offers a tremendous amount of software across the whole spectrum of recreation, education, business—more of it than any other machine by far. To a software writer, that says something!" ■

System Saver[®] didn't become the Apple's[®] number one selling peripheral by being just a fan.*

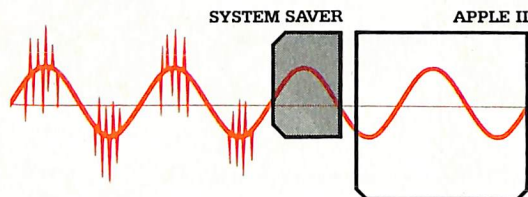
What made over 100,000 Apple owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

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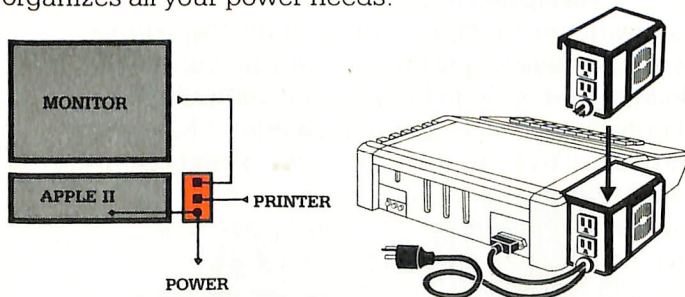
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

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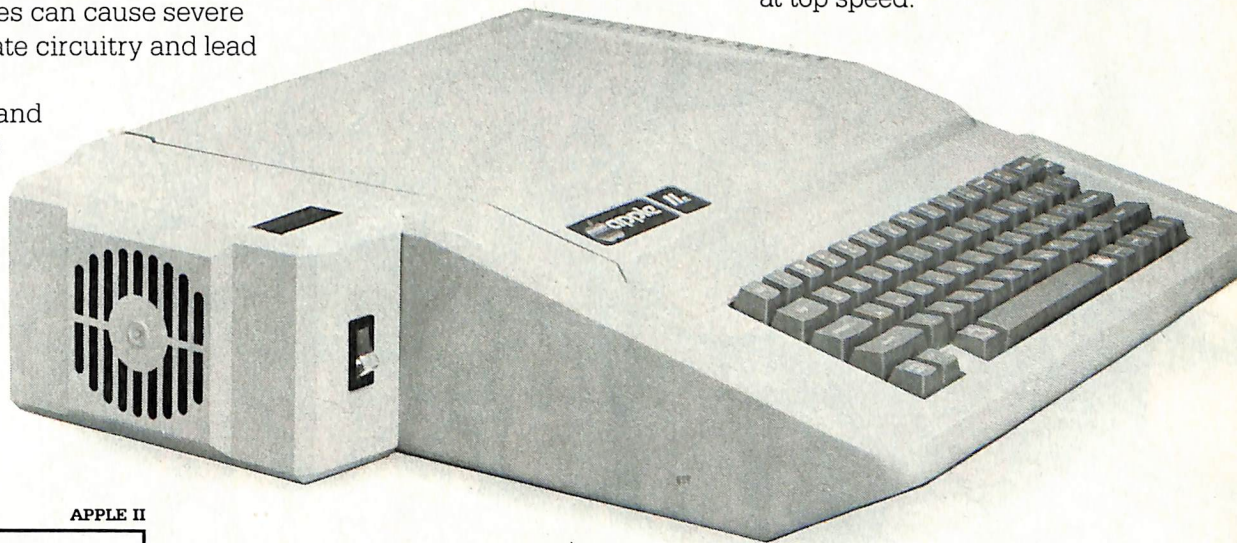
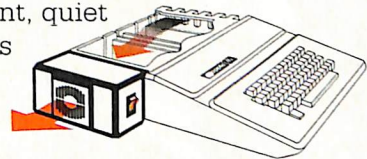


It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

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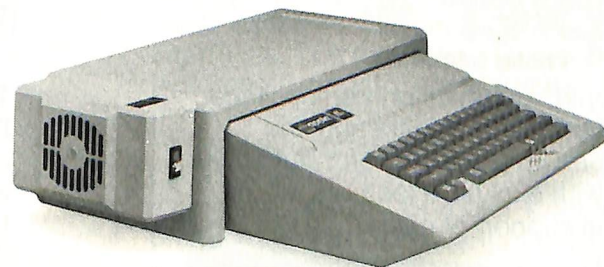
Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

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*Softsel Computer Products Hot List. **PC Magazine, March 1983.

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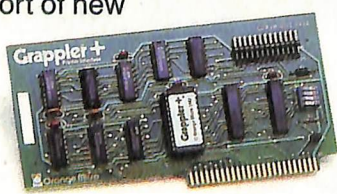
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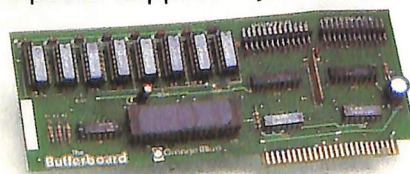
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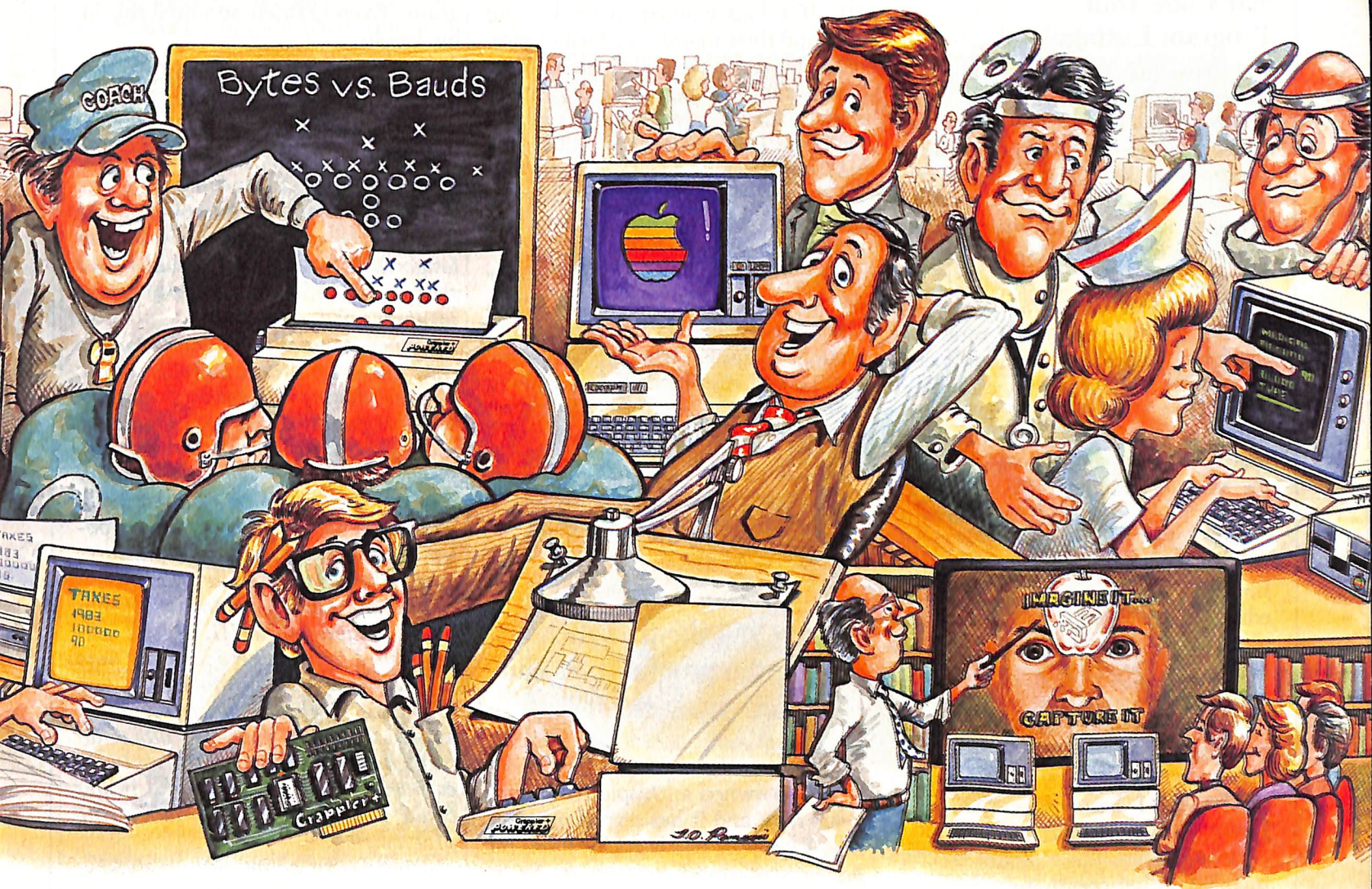
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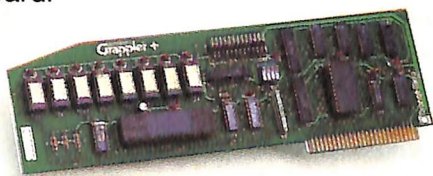
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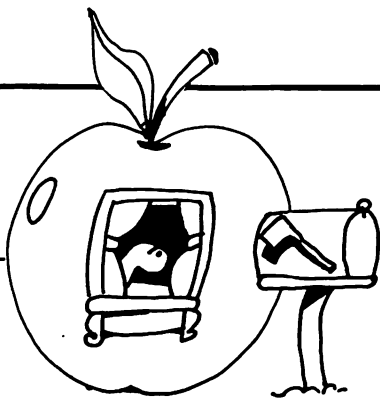
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Letters

Bar Code Your Program Listings

I have just finished reading Mr. Shuerger's letter in the November edition of *inCider*. I, too, would like to see bar codes used in magazines as program listings. While I do not own a bar code reader, I would certainly buy one if it would save me the trouble of typing the programs in and debugging them.

There were three other letters that also caught my eye in that issue. The first was "The Five Commandments" by Brother Tucker. I fully agree with him but I think there should be a number six: Thou shalt not print machine language opcodes without the assembly listings. (They are very helpful if, God forbid, you have an error.)

The second letter was from Dr. Buchholz, castigating you for your editor's comment to Jerry Krogy. I, too, had read Jerry's letter and found nothing wrong with your comment. I own the same utilities as Jerry and I have a subscription to "Hardcore." I am a pirate and I enjoy comments like yours.

The third letter was "An Open Letter to My Husband." I found it very enjoyable. Janet should be commended on her creativity.

Robert Heath
725 East 35th Street
Erie, PA 16504

The Jag Saga

The answer to Mr. Green's question in October's *Hot Cider* is no, learn from your experience.

The Jaguar has had problems for years. Japan and Germany build better cars than the English. But why not buy a good old GM car like a Buick, Olds or Cadillac? I own a 1982 Sedan DeVille and I love it. It gets up to 25 miles to the gallon, has all the features anyone would ever want and has a great resale value. I could buy three of these cars for the price of one Mercedes 450, and they'd be a lot less

expensive to maintain, too.

Mr. Green, I subscribed to *inCider* to read about Apple computers, more specifically, to read about the Apple III. If I had wanted to read about cars and their merits—or lack of merits—I would have called on Petersen Publishing or some other publisher of car-related magazines. I don't appreciate this kind of editorial and I think it shows that you have not done your homework for the microcomputer user and are, instead, just filling space.

One of the first issues of *inCider* that I received had an editorial which threw cold water on the Apple III. I thought to myself, this guy is a little strange and dismissed it. Then I was made happy when Bill O'Brien set the record straight on the Apple III.

"While I do not own a bar code reader, I would buy one if it would save me the trouble of typing the programs in and debugging them."

I have owned an Apple III for two years now and it has served me well. Yes, I know it had a rocky start, but Apple was smart enough to fix it. (Too bad they haven't seen fit to push the machine a bit more.) I would be willing to make a wager with an experienced IBM PC owner that I could turn out 25 percent more work during a week than he or she could with an IBM.

Bill O'Brien's column for October seemed to follow your editorial lead—that is, he wrote about his early childhood rather than sticking to the subject of Apple IIIs. The fact that he was going to write a monthly article on the III was one reason why I subscribed to your magazine. Then a couple of issues ago he wrote a whole column on WordStar and getting it running on the Apple III. What a waste of time and space. With so many other good word processing

packages written for the III, why would anybody want to use WordStar and have to buy an expensive card as well as an expensive program? Even O'Brien admitted this in his article.

Charles F. McConathy
13238-A Fiji Way
Marina Del Ray, CA 90291

Dear Charles:

Thanks for your letter—appreciated. But if you had been with me longer as a reader you would know that I do my homework before writing.

I have a number of cars—American, Japanese, British and German—I read the car magazines carefully—I'm an avid driver, so I need a responsive car—I rent American cars frequently on my trips, so I know them well—and so on. My editorial was not to fill space, which is no problem for me, but to put some pressures where they may do some good.

The market seems to reflect my own reaction to the III. It isn't selling well. I had one here for some time in my office—finally moved it along to the *inCider* staff [where it's much appreciated—eds.] as it didn't do enough for us. If you're an Apple III enthusiast, it might be helpful if you could help others to surmount the problems.

You're right about authors sticking to pertinent matters. I agree. I exempt myself from this—partly from ego, but more with the concept of getting readers used to *inCider* being not too stuffy. Whether a columnist is stuffy or not isn't as relevant as the boss being open to a wide variety of ideas. I have a wide range of interests in addition to the Apple, so we're not monomaniac-driven like some of the publications.

Best regards,
Wayne

But seriously, folks. . .

I have owned an Apple II Plus since 1980 and continue to be impressed with what it, along with a little creative programming, can do. But

hard ware

let's not kid ourselves! In reference to "inCide Out" in the October 1983 edition, it is ridiculous to assume that any business that is less than a billion-dollar operation occupying less than a city block can most likely run on a 64K Apple.

Perhaps you should visit a few medium-sized businesses and see the incredible amount of data they handle with those "inexpressibly expensive and unmanageable" computers. Many 50-million-dollar companies need 256 megabytes of disk to cover their manufacturing, inventory, and accounting systems. Often there are as many as a dozen people updating and inquiring into this data simultaneously. Also, most systems interface with each other. If any applications are small and do not require this large pool of data, I think an Apple is certainly preferable to a large time-sharing computer.

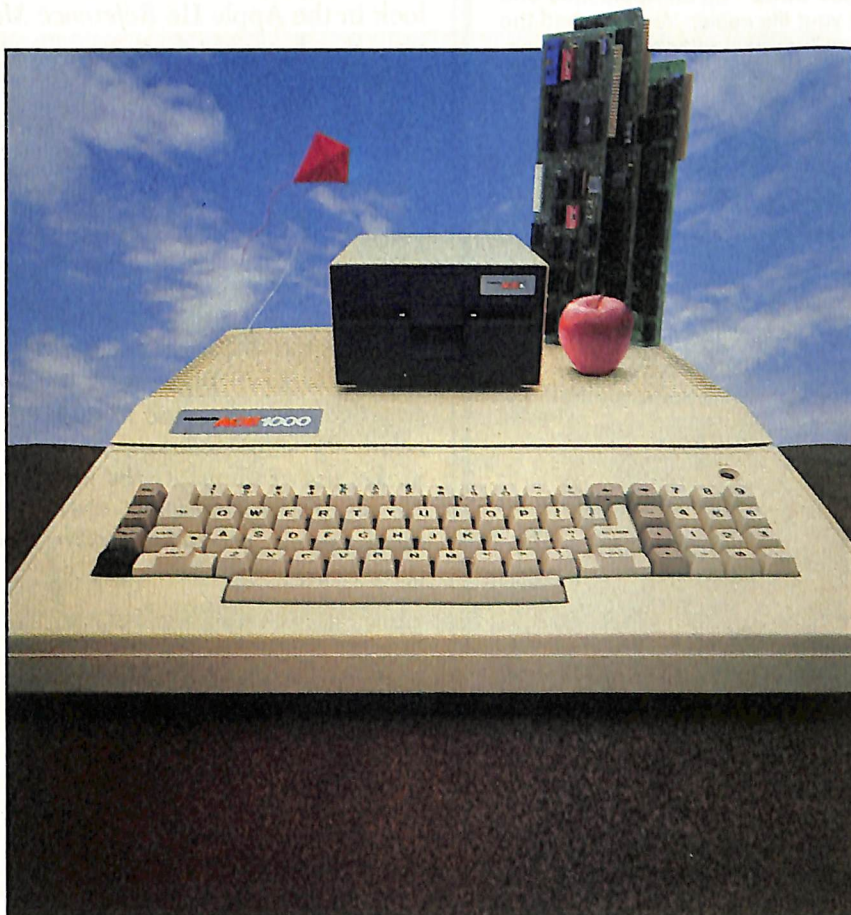
Dawne Wimbrow
101 Crowndale Drive
Taylors, SC 29687

Hmmm...looks like the hyperbole worked a little too well.... Actually, our intent was merely to underscore what Corporate America is discovering: that the Apple is every bit as serious a business machine as comparable products made by the "traditional" companies. In the same breath we too must acknowledge that the machine, bodacious as it is, still has its limits.

InKorrect

When I read the letter by Jim Wiebe in the October issue, I was reminded of a similar tip I saw years ago for typewriter ribbons; the only real difference was the recommendation to soak the used, dry ribbon in glycerin. Since WD-40 is a lubricating oil, it seems to have the potential for staining the page. Glycerin may be able to prevent that.

Bruce Dagel
617 Orange Street
Muscatine, IA 52761



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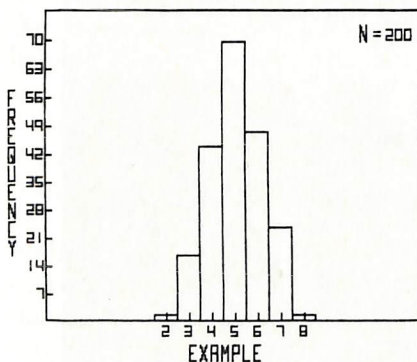
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Key Note

Would someone please tell me what the delete and tab keys are for on the Apple IIe. The manual says look in the Apple IIe Reference Manual, but I cannot find one of those anywhere.

Paul M. Jones
1407 Brierwood
Cleveland, MS 38732

The tab key produces an ASCII 9 (ctrl-1), and the delete key produces an ASCII 127. These keys are comparatively idle because to date only a relatively small amount of software makes use of them. As the selection of IIe programs broadens, expect to see many more products which utilize these keys.

II Plus, II Still Equals

What is going to happen to us "Model T" (read, Apple II and II Plus) owners as the new Apple technology (read, Apple IIe, Lisa and Macintosh) stampedes away from us?

Recently, I have been looking at new software and hardware advertisements and have found that the vast majority is being offered for the IIe only. It appears that II and II Plus owners can no longer take advantage of new technological advances.

Questions: 1. Is there or will there be a way to upgrade the Apple II or II Plus in such a way that it will become compatible with the IIe, Macintosh and other future Apple versions? 2. Can we expect a resurgence in interest for the manufacture of II and II Plus software? 3. If I were able to sell my current Apple II Plus for a reasonable price, should I wait for the Macintosh or go ahead and buy the IIe?

Carlos Neu, M.D.
14 Longfellow Road
Cambridge, MA 02138

By the time you read this the Macintosh should have already made its formal debut, so you've probably already checked out the initial press reports and have some solid specs by which to compare the new machine to your II Plus.

But wait a minute—maybe you shouldn't give in to this Big Mac attack just yet; maybe your old II Plus isn't quite the tin lizzie you think it is. We can't agree with your observation that most of the new software and hardware coming out for the Apple is designed exclusively for the IIe. The manufacturers in this market aren't yet ready to abandon the huge army of IIs and II Pluses already out there in the trenches. Most manufacturers are, in fact, building a high degree of "lateral compatibility" into their new products.

Without doubt, the Apple II and II Plus will be around for years to come. They are classics.

Bar Code Booster

In response to a letter published in the November issue, I must cast one vote for coding the Table of Contents in bar code. But why stop there? How about program listings in bar code?

Databar Corp. of Eden Prairie, MN, sells a bar code scanner for use with Atari, Commodore, TI, Sinclair, and Radio Shack computers. Possibly it could be modified for use with the Apple. The manufacturer claims that it can load a 16K program in under 2 minutes. That doesn't sound much worse than using cassette storage (you remember cassette storage, don't you?).

There is also a child's educational toy on the market which reads bar code printed in an assortment of storybooks available for use with this device. It might be possible to gingerly tear into it and bring out the scanned data for use with a simple interface in the Apple. Once a month, when the new issue of *inCider* arrives, send the kids away to their grandparents, grab the toy, and have

soft ware

fun. When the task is complete, return it to the toy storage area (the floor), and no one will be the wiser!

This is all speculation, of course, but I would like to see the use of bar code in your fine magazine.

Art R. Spaziano
64 Plain St.
Norton, MA 02766

The "I's Habit

Gareth Tucker's Commandments (November) are important and, I hope, may bring about a change in policy in program listings. I have two other suggestions which would help clear up high-probability errors in copying programs:

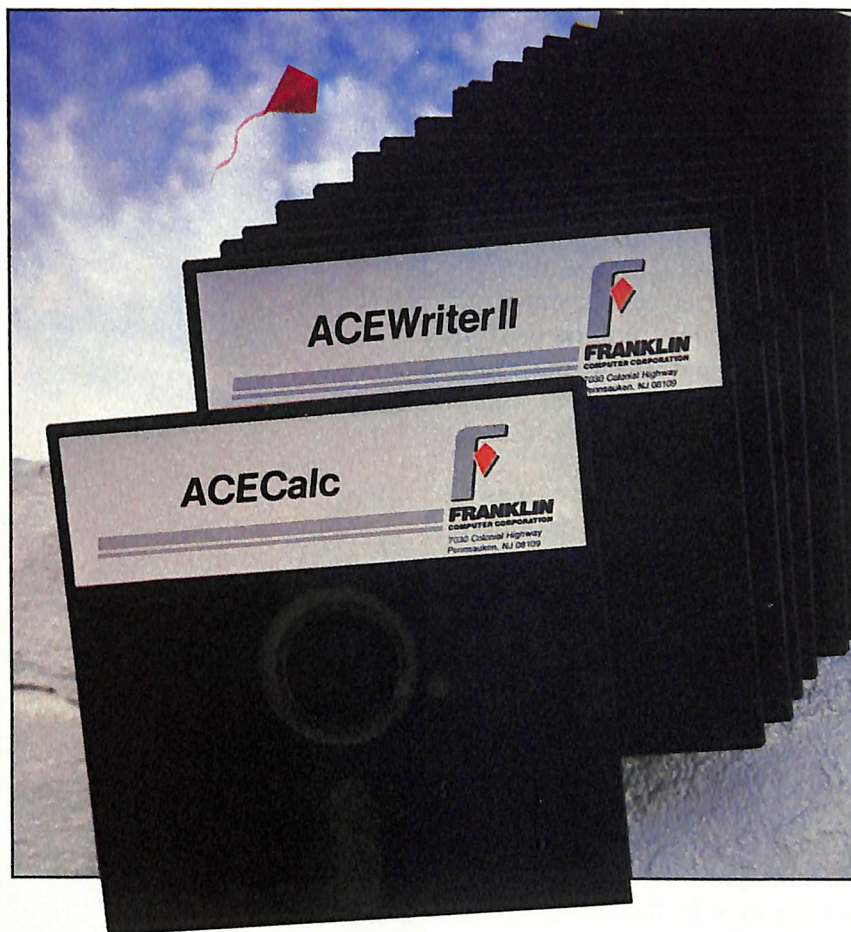
1. Thou shalt not use the uppercase "I" as an index. It is all too easily confused with the digit "1". There are other letters which can be used and which are not so easily confused with numbers.

2. Thou shalt slash thy zeros. As long as your type fonts do not permit printing the slash-style zero, the likelihood of confusing the letter "O" with that digit is very high. Either get a font which permits the slashed zero or write programs that avoid this confusion.

The bar code idea deserves a real trial. Why not print a machine language program which can accept input through the game port from an inexpensive bar code reader such as the Casio?

Benjamin W. White
20 Malvino Court
Tiburon, CA 94920

Your suggestion to eliminate the letters "I" and "O" from listings is an excellent one. Unfortunately, many programmers are set in their ways and refuse to change, pointing out such things as using "I" for "Index" outweigh the importance of avoiding error. And since our programs are submitted by readers, not written by our staff, we're bound by popular convention.



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The Applesoft Adviser

by Dan Bishop

Mountains on a Micro

As I write this column, signs of fall are all around. It is September 19th. The high mountain air has a slight chill that tells of snow not too far away. Soon it will be time to wax those skis and enjoy the more tangible benefits of living snug against the continental divide high in the Colorado Rockies.

With the summer tourist season over, our town of 5000 is no longer bustling and bursting with activity. Before long the visitors will be deer and antelope coming to graze in pastures nearby, and mountain sheep will make their way down into the valley to winter.

But what, you may ask, does this have to do with the microcomputer and cottage industry? Well, for my family and me, just about everything. The microcomputer has made it possible for us to live in this beautiful setting. Let me tell you our story...



Home

The mid '70s found us in the heart of the Missouri Ozarks where I taught chemistry at a small college. However, a strange longing came over both my wife and me to return to our home state of Colorado. Every summer visit to those majestic mountains and glistening, youthful streams seemed to intensify that desire. But we had no independent income, retirement was (and is) a long way off, and there were no available teaching positions for me in the Colorado college system, so those desires became long distant dreams.

Then the microcomputer entered the picture and helped turn those dreams into reality. In the fall of 1978, I applied for the money to place a microcomputer in the chem-

istry laboratory at the college. I had been working with computers for years as an adjunct to my scientific interests, and knew quite well how I could put the machine to good use. To my surprise, I received a grant for two computers and immediately began writing chemistry tutorial programs and laboratory simulations to be used by my students. These programs were received with such enthusiasm that I decided to polish them up a bit and advertise their availability nationally. The orders began coming in from high schools and colleges throughout the nation. Custom Comp was born!

At the same time, several local businesses purchased microcomputers and called on me to do custom

programming for them. I soon found myself teaching during the day and working on business applications programs into the wee hours of the night. All the while I was developing my skills as a programmer and furthering my knowledge of small businesses and their computer needs. Of course, along the way, I purchased my own microcomputer. It was during this period that I began writing articles for *Kilobaud* (later to become *Microcomputing*), yet another source of income beyond teaching.

By 1981, it appeared that these

You can write to Dan Bishop, in *Cider's* own cottage columnist, at Custom Comp, PO Box 429, Buena Vista, CO 81211.

computer related incomes might be sufficient to carry us through a move and help us establish a new home in Colorado. At last we felt in charge of our lives. I turned down my 1981-1982 teaching contract, which included a sabbatical leave and promise of promotion to full professor the following year, and in June we simply packed up and relocated to Buena Vista. And let me tell you, that decision was one of the hardest ones I have ever made. After all, there are few jobs that are more secure than a tenured faculty position at a financially well-endowed college!

Long Winters Ahead

Summer of 1981 was perhaps one of the worst times to begin a new high tech business in a rural area, especially in the upper Arkansas River valley of Colorado. The nation slid into a deep recession and people quit buying new cars, which forced a tremendous cut in steel manufacture. Since the production of high strength steel requires a substance called molybdenum, the world's largest molybdenum mine was forced to close and lay off thousands of miners. Guess where the world's largest molybdenum mine is!

Many Buena Vista businesses had been seriously interested in acquiring microcomputers in the summer of 1981. When we first moved to Colorado, it seemed that my business as a programmer and consultant would be brisk and continuous. By October, all that the local businesspeople were worrying about was survival, and computers were the farthest things from their minds. Except for two important accounts that I had established earlier, local support for my services all but vanished.

Unfortunately, school budgets also tightened during this period, and my educational program mail order business began to taper off as well. However, public interest in microcomputers remained high, which created a demand for evening college extension courses. For two years I have spent two to three evenings a

Continued on page 24.

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You can squirm. Beg. Plead.
And moan. Nothing will save
you, or your Apple, from being
blown sky-high by this game.
Don't worry. The effect's not per-
manent. Your Apple will recover.
But will you?

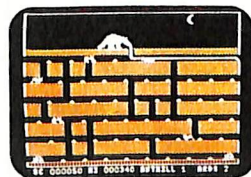


your Apple.*



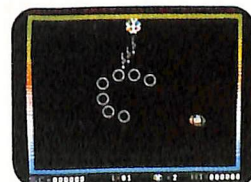
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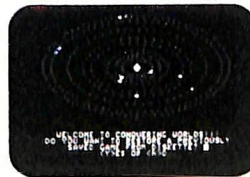
Argos™

And if you like to push people around, lay off your little brother and take on these aliens instead. Save the Domed City from doomsville.



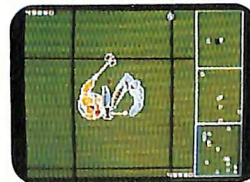
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No, *Super Bunny* is not referring to all those Playboys stashed under the bed. It's a strategy/action game that just might turn your brains into carrot puree. Cover your burrow!



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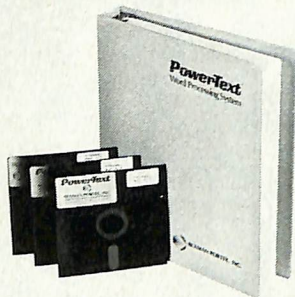
Avoid violence, but be prepared. Incredible graphics make this rated R! But if you're a wimp, pass this game up. It's not for babies.

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The Applesoft Adviser

Continued from page 21.

week providing introductory computer and programming courses through a local community college and a more distant state college. At the same time, I have begun to write more.

From October of 1981 through April of 1983, my wife's income provided the mainstay for our economic survival. During 1982, I picked up only one major local account. In April of 1983, however, two more local businesses decided to computerize, and in May and June I picked up three more accounts. Suddenly I had enough work to keep me busy 12 hours a day, 7 days a week. This lasted through the summer, but began to fade by the end of August.

Tourist season has ended now, and our town is tightening its belt for another winter. I suspect I won't see much new local business until next spring. But I have established a certain reputation and confidence in my business over the past two years and firmly believe that next spring and summer will be my best yet. To tide us over I will be teaching full time (computers, not chemistry!) for the local junior college.

In the meantime, I have five software packages I have developed over the last two years for local business accounts that I am confident will sell if properly advertised. This fall and winter I'll polish these programs up and complete the documentation manuals. I hope to have them ready to go by next May. It will be fun to see Custom Comp back in the mail order business again!

Lessons in Small Business

No doubt many of the difficulties in establishing my business have been caused directly by our choice to locate in such a remote area. However, we had anticipated deriving the lion's share of our income from mail order. But I underestimated the weakness of the market I was appealing to, and as the cash flow dropped off that first year I spent most of my time doing a variety of computer-related odd jobs

just to survive. No time was left for developing new courseware that might have kept the mail order business viable. I still dream of developing a completely unified computer course in beginning chemistry that would be appropriate for the high school and freshman college levels.

One lesson to be learned here is that it is very easy to underestimate the amount of capital needed to start a new business. I had to rely too heavily on current income to maintain the business through those first two years, which forced me to devote time to "dead end" projects just to maintain the cash flow. In fact, this is a problem that has yet to be resolved and explains why I am teaching full time again. It is fortunate that I still enjoy teaching.

A second lesson is the importance of effective advertising. Advertising for a mail order business is probably the single most significant expenditure requirement. It's essential to put the money in the most appropriate places. For the specialized software that I was producing, my advertising dollar would have been quite ineffective in popular computer magazines. On the other hand, by advertising in directories dealing only with educational software, I obtained national coverage at a fraction of the cost.

For a firm dealing with local clients in a rural area, advertising is free. Although radio and newspaper ads are available, the most effective medium is word-of-mouth. This is a two-edged sword, however. Realizing that each local client could (and probably will) spread the word about your service, you'll find yourself working extra hard to go that extra mile for everyone you deal with. The payback from this type of advertising is not immediate. Reputations are built up over years, not months. But for Custom Comp, most of the local business that I had this summer was due directly to referrals from clients with whom I had been working over the previous two years.

Will It Last?

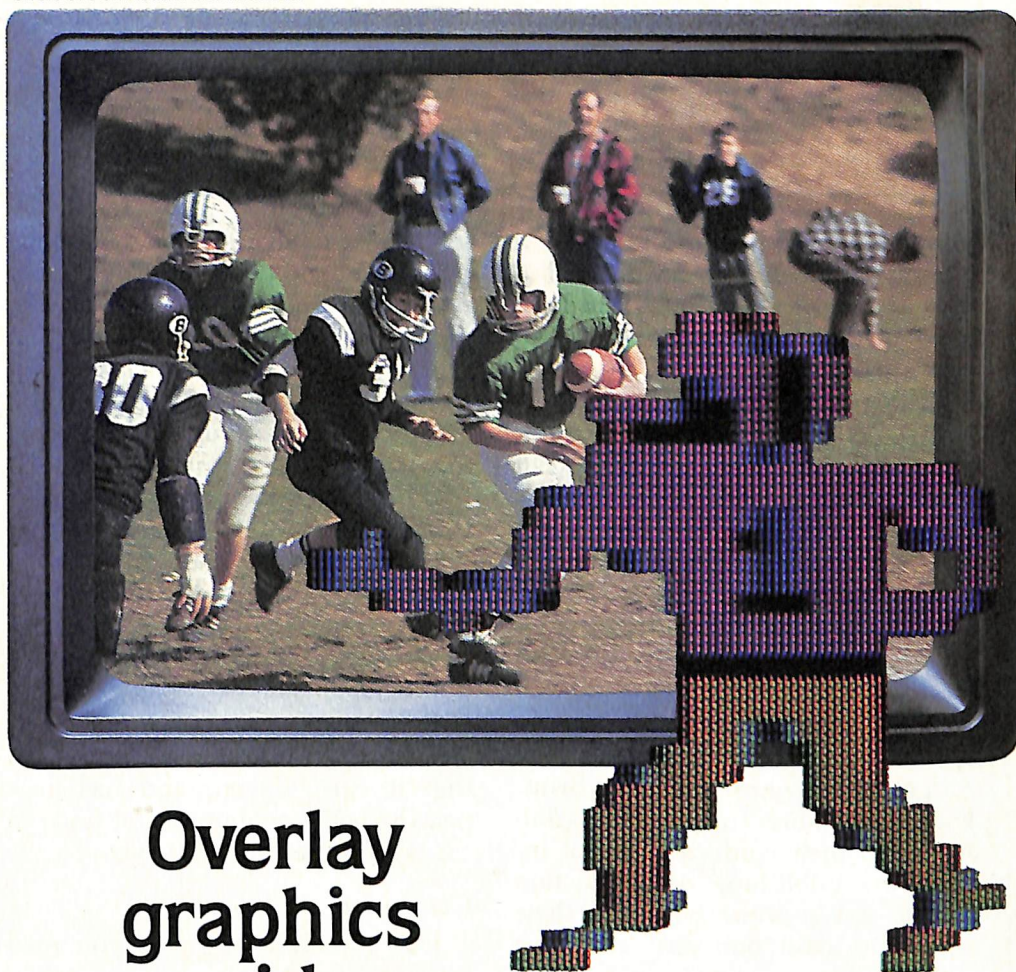
Although we moved Custom

Comp from Missouri to Colorado only 30 months ago, the business is actually over five years old. When I first started it, microcomputers were relatively fresh on the market. At that time, there were even predictions that they would remain hobby machines and toys. Companies like IBM and Xerox weren't even interested in this latest electronics fad. A small business had plenty of niches to fill without worrying about competition from the big boys—an ideal environment for cottage industry.

What disturbs me now is the large companies with national reputations and heavy advertising dollars competing against the established electronics cottage industry. When I began, a Xeroxed brochure describing the programs Custom Comp had available was sufficient to attract attention and orders in the educational software marketplace. Today, that type of announcement would be competing against slick, multi-color brochures or catalogs that are mass-mailed indiscriminately. It may be nearly impossible for the undercapitalized small business to break into this market today.

Of course, the independent author could assign all or part of the rights to his programs over to a major publishing firm in return for royalties. This solves the advertising and distribution problems. But the price demanded for these services may be outrageously high. A 10 or 15 percent royalty payment on a program that sells for under \$20 is not much, and the volume of sales for software oriented toward a limited market in the first place is not sufficient to produce that "independent income." And in spite of solving two problems, assigning rights can create other new problems.

For example, one of my earlier software packages was accepted by such a publisher, but didn't reach the market until over 18 months had passed, even though neither the program nor its documentation needed to be changed. A program written 18 months ago may not service a current



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computer model. Furthermore, a program that might have filled a need 18 months ago might find itself in competition with several such programs today.

I have also had programs submitted to a major publisher mysteriously disappear. . . . I can hardly wait to evaluate their next round of programs for chemistry teachers! Even though my material has been formally copyrighted, I doubt there is much I could do should I find some corporation mass producing software that was "almost" identical to my own.

I have had somewhat better luck with other software mail order firms. These companies merely drop-ship orders, so their concern does not include the publishing or production end of the process. Some of these companies mail out very attractive

software catalogues, and are happy with a 35 to 40 percent discount from my own advertised prices. They are, of course, free to sell the software at whatever price they then choose, but I retain all rights to the programs, including the right to use other companies for program distribution as well.

If there is an answer, perhaps it lies in an as-yet unwritten program that will create its own market and sell in the tens of thousands before the competition can produce a program of their own—a program that will turn a struggling one-man operation into a giant corporation overnight. The curious thing about this business is that it can happen, and has happened—not once, but several times in the last few years. Just maybe. . .

Conclusion

Last month I suggested you read

this month's column to see if I would recommend striking out on your own with a computer-related cottage industry. Actually, only you can judge whether such a life is for you. I think I have worked harder in the last 30 months than I have ever worked in my life. My business is improving, but it's still struggling along. Given the accelerating rate of change in this industry and the established industry giants, it may be harder than ever to get a small business started and keep it going.

On the other hand, if you can fill a niche that is not occupied by anyone else, and are willing to take the risk, invest the cash and work like a dog, then don't hesitate. And the faster you move in and market your service or product, the more likely you will be to succeed. But don't forget to stop occasionally to smell the roses! ■

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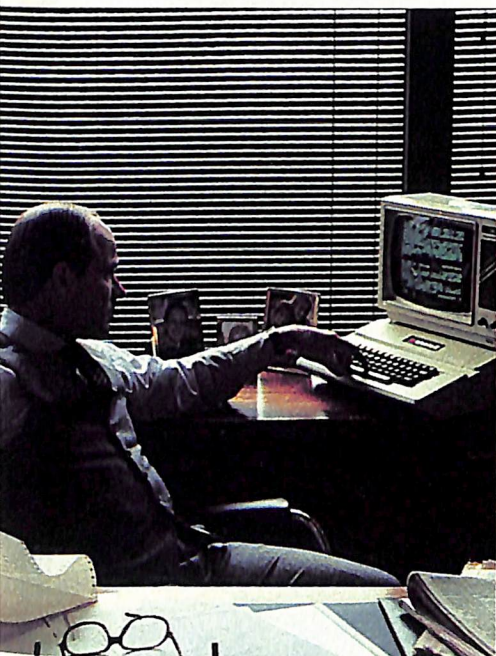
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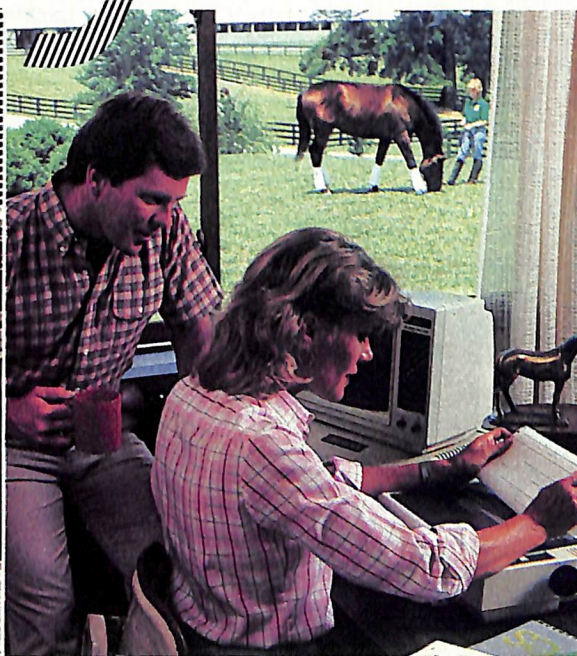
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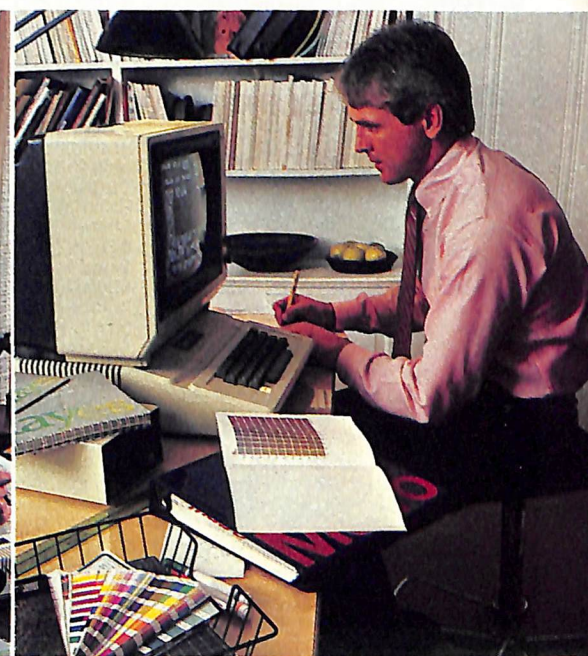
Circle 51 on Reader Service card.



"Thanks for the prompt reply. Sure was a lot faster than waiting for the mail!"



"Gary: The pedigrees for next week's auction are as follows..."



"Attn. Prod., Sales, Purch.: Recommend 50% blue, 30% red screen for closest match."

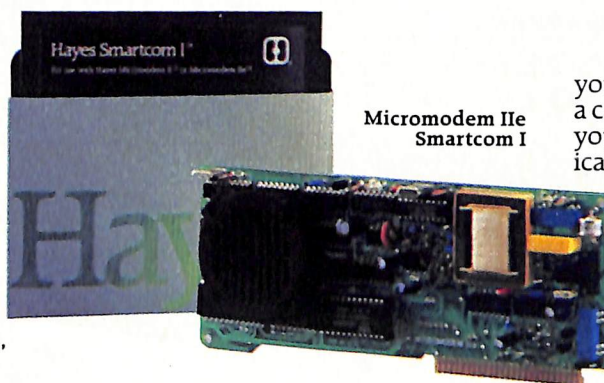
A complete plug-in communications system for Apple[®] computers. From Hayes, the established telecomputing leader: the simple but sophisticated Micromodem II[®] plug-in board modem and its companion software, Smartcom I[™]. Everything you need to expand the world of your Apple II, IIe, II Plus and Apple III. In one, convenient communications package.

With Micromodem IIe and Smartcom I, you can access data bases, bulletin boards, and the varied resources of information services. Plan your travel itinerary via computer, including flight numbers, hotel and rental car reservations. Retrieve and analyze daily stock and options prices. Work at home and send reports to your office. You can even do your gift shopping by computer!

Micromodem IIe. Think of it as your Apple's telephone. It allows your computer to communicate with any Bell-103 type modem over ordinary telephone lines, at 110 or 300 bits per second. Micromodem IIe installs easily in an expansion slot, and requires no outside power source. It connects directly to either a single or multiline modular phone jack, to perform both Touch-Tone[®] and pulse dialing.

Micromodem IIe dials, answers and disconnects calls automatically. And, unlike some modems, it operates in full or half duplex, for compatibility with most time-sharing systems.

A built-in speaker lets you monitor your



calls when dialing. That way, you'll know if a line is busy. With Smartcom I, Micromodem IIe automatically redials your last number.

Discover how Micromodem IIe can help maximize the capabilities of your Apple. While Smartcom I software will minimize your efforts.

Smartcom I companion software. For effortless communications.

Whether you're a newcomer to personal computing or a seasoned professional, you'll appreciate the ease and speed with which you can perform any communications function. Thanks to Smartcom I!

Let Smartcom I guide you through a few easy-to-answer questions to tailor the program to your particular needs. Then you're ready to go!

Make a selection from the Smartcom I menu to manage your communications, files or printer. Program prompts guide you along the way. And menu selections let

you easily make a call, end a call, or answer a call. When you're on the receiving end, your Micromodem IIe answers automatically, even if you're not there!

Convenient! And so is the Smartcom I memory for phone numbers. Smartcom I stores three of your most frequently called telephone numbers and one prefix. Plus, it also remembers the last number dialed.

Smartcom I also provides a directory of the files stored on your disk.

And lets you create, list, name, send, receive, print or erase files right from its menu.

Smartcom I is as versatile as you need it to be. It accepts DOS 3.3, Pascal, CP/M[™] 3.0 or CP/M Plus[™] operating systems. And accommodates up to six disk drives and several printer interface cards.

Like all our products, Smartcom I and Micromodem IIe are backed by excellent documentation and full support. Including a two-year limited warranty on Micromodem IIe and a 90-day warranty on Smartcom I!

See your dealer today. Then plug into the exciting world of telecomputing.

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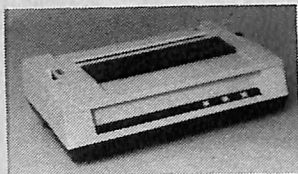
Plain Talk About Printers...

Dot Matrix Printers

There are several new printers on the market that are worth looking over: Diablo's Series 32, Toshiba's P-1350, InfoRunner's Riteman & the Tally Spirit. We may add the Panasonic line shortly.

C. ITOH

Prowriter

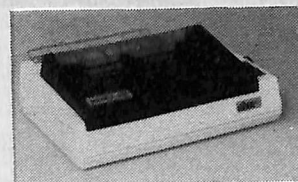


The old standby, & a good choice for Apple owners. C. Itoh's **Prowriter** has speed (120 cps), a buffer (1.5K), 10, 12, & 16 cpi (plus a proportional font with correspondence quality) and dot graphics (160x144 dpi). One of our biggest sellers. The **Prowriter 2** has the same specs, but in a 136 column format.

Prowriter **\$399.88**
Prowriter 2 **\$719.88**

STAR MICRONICS

Gemini 10X/15 Delta 10/15



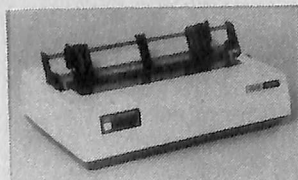
The **Gemini 10X** (120 cps) features 10, 12, 17 cpi, italics, a correspondence font, 120 x 144 dpi graphics matrix & a 1K buffer. The **Gemini 10X** comes with friction/tractor feed & uses plain spool ribbons. The **Gemini 15** is the 132 column version.

Star's **Delta 10** features both parallel and RS-232C interfaces, 160 cps print speed, an 8K buffer, plus the standard fonts (10, 12 & 17 cpi), dot graphics, friction/tractor feed and spool ribbons. The **Delta 15** is a 136 column version.

Gemini 10X **\$309.88**
Gemini 15 **\$459.88**
Delta 10 **\$529.88**
Delta 15 **\$CALL**

OKIDATA

Microline Series



The **Microline 92** (160 cps) are ideal for word processing. They offer 10, 12, 17 cpi & correspondence font (all w/double-width) on 80 columns, pin/friction feed (tractor is optional on the 92) & dot-

addressable graphics (120 x 144). Centronics parallel interface is standard; the serial (RS-232C) interface is optional. The **93** is a 136 column version.

The **Microline 84** (132 col) is the Step 2 version, featuring 200 cps at 10, 12, & 17 cpi (w/double-width), all with a correspondence mode & dot addressable graphics. Parallel or serial (RS-232C) interfaces

The **Microline 82A** (80 col) & **83A** (132 col) are data crunchers, period. They print 120 cps, at 10 & 16 cpi (5/8 double-width). Dot-addressable graphics are optional.

Microline 82A **\$389.88**
82A/92 Tractor **\$59.88**
Roll Paper Holder **\$49.88**
Microline 83A **\$599.88**
82A/83A Okigraph 1
Graphics ROM **\$49.88**
Microline 92 **\$459.88**
Microline 93 **\$759.88**
92/93 RS-232C Interface **\$99.88**
Microline 84 **\$1029.88**
w/RS-232C Interface **\$1139.88**

TOSHIBA

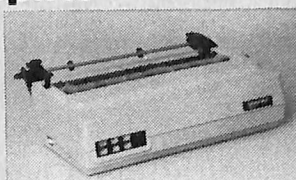
P1350

An exceptional printer that produces the best near-letter quality we've ever seen. The **P1350** prints at 192 cps (100 cps in near-letter quality), & features 132 columns, 10 & 12 cpi (plus double-width) & a near-letter quality font with proportional spacing. It has all the sub/superscripting features you'd expect, plus dot graphics (180 x 180 dpi). Parallel or RS-232C interface (specify).

P1350 **\$1759.88**

MANNESMANN TALLY

MT-160 L MT-180 L Spirit



The **MT-160 L** (160 cps) is a sharp printer. The 10, 12, 17 & 20 cpi, plus correspondence font, makes the **MT-160 L** very versatile. It has both parallel & serial (RS-232C) interfaces, and the menu-driven installation from the control panel is easy to use. Friction and adjustable tractor feed are standard issue. The **MT-180 L** is the 136 column version.

The **Spirit** (80 cps) is Tally's new, low cost draft printer. It has 10, 12 & 17 cpi fonts, friction & adjustable tractor feed, and a unique square-wire printhead that makes even draft printing a pleasure.

MT-160 L **\$649.88**
MT-180 L **\$849.88**
MT-Spirit **\$329.88**

EPSON

FX, RX & MX

The **FX-80** (160 cps) has a correspondence font, 10, 12 & 17 cpi, italics, double-strike/width/emphasis & dot graphics, plus a 2K buffer. Friction & pin feed is standard; the adjustable tractor is optional & cost extra. The **FX-100** is the 136 column version & includes the adjustable tractor.

The **RX-80** & **RX-80 F/T** (100 cps) are upgraded versions of the MX Series.

Epson RX/FX **\$CALL**

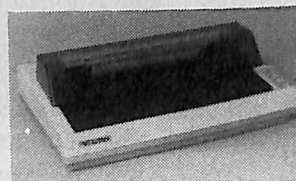
Other Dot Matrix Printers,

Anadex
DP-9501 **\$1189.88**
DP-9620 **\$1259.88**
DP-9625 **\$1369.88**
WP-6000 **\$2279.88**

DIABLO
Series 32 **\$1049.88**

IDS
Prism 80 **\$1079.88**
w/4-color **\$1439.88**
Prism 132 **\$1239.88**
w/4-color **\$1669.88**
MicroPrism **\$529.88**

InfoRunner



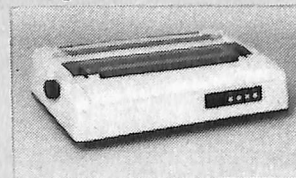
Riteman **\$349.88**

Letter-Quality Printers

The new, low-speed letter-quality printers are making quality affordable. And the high-speed models are coming down in price too. Still, get a dot matrix printer for drafts & as a backup.

C. ITOH

F10/A10



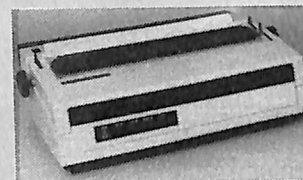
The C. Itoh **F10-StarWriter** (40 cps) offers top speed at a good price. It uses Diablo wheels & ribbons (Qume code), 10 or 12 pitch, 6, 8 & 1/48" line space, plus 1/120" horizontal spacing. The **F10-Printmaster** has the same specifications, but prints at 55 cps. A new printer, the **A10-StarWriter** has the same specs, but it's slower (18 cps) and less expensive.

All of the e printers use the same bi-directional tractor feed and single-bin sheet feeder. Specify parallel or RS-232C when ordering.

A10 StarWriter **\$609.88**
F10 StarWriter **\$1219.88**
F10 Printmaster **\$1569.88**
F10 Tractor **\$289.88**
F10 Sheet Feeder **\$609.88**

SILVER REED

EXP-550/500



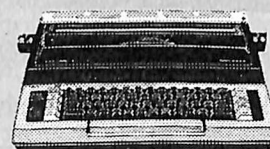
The Silver Reed **EXP-550** (17 cps) is a 132 column letter-quality printer with 10, 12 or 15 pitch, sub/superscript, underlining and true Diablo 1610 emulation, making it compatible with most word processing software. It's friction fed, and it features a page injector; an optional tractor is also available.

The **EXP-500** (12 cps) is a 100 column letter-quality printer with the same specs as the **EXP-550**, but slower and without page inject.

EXP-550 (Parallel) **\$699.88**
EXP-550 Tractor **\$139.88**
EXP-500 (Parallel) **\$469.88**
EXP-500 Tractor **\$129.88**

SMITH-CORONA

Messenger



The **Memory Correct III Messenger** (the full name) is ideal for the home or small office. It combines the features of an electric typewriter and a letter-quality printer. It features 12 cps, 3 pitches (10, 12 & 15), variable line spacing, 10.5" writing line, backspacing & auto-correction. It comes complete with parallel/RS-232C interface.

Memory Correct III
Messenger **\$619.88**

INTERACTIVE STRUCTURES

Pkaso

The **Pkaso** is our interface card of choice. It's dedicated to a specific printer, which means you'll get to use all the features on that printer.

Pkaso can dump text or graphics from the screen, rotate graphics 90° to the printer, printing in 16 shades of grey (halftoning), etc. It has excellent documentation, plus a demo disk with utilities on it for VisiCalc, AppleWriter and others. Printers covered include the C. Itoh/NEC/Apple DMP, Epson MX/FX Series, Gemini 10/15, IDS Prism Series*, Okidata 80/90 Series & Centronics Series.

Pkaso Interface **\$139.88**
*IDS Prism (Color) **\$159.88**

ORANGE MICRO

Grappler +

The **Grappler +** is an excellent choice if you have more than one printer, but the **Grappler +** does not fully support every single feature on every printer. The **Bufferboard** lets you add 16K a print buffer, but only for the **Grappler +**.

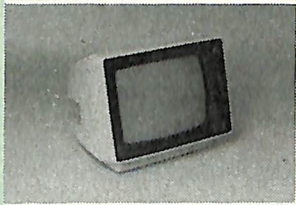
Grappler + **\$149.88**
Bufferboard (16K) **\$149.88**

Monitors

We can't imagine why people want RGB monitors on Apples or Franklins, but we get an order a month. Take our word for it—unless you're doing something unusual, composite video output is more than sufficient.

NEC

JB-1205M



Slick design and specifications for an amber monitor. NEC's **JB-1205M** has an 18-20 MHz bandwidth and a crisp, clear amber display. Standard 80 column by 24 line (12" diagonal screen). The **JB-1201** is the green screen version.
JB-1205M (amber) \$179.88
JB-1201M (green) \$169.88
JC1203 (12" RGB) \$639.88

AMDEK

300 (12" green) \$149.88
300A (12" amber) \$159.88
Color I+ (Com) \$319.88
Color II (RGB) \$649.88
Color III (RGB) \$379.88

USI

Pi-3 (12" amber) \$189.88
Pi-4 (9" amber) \$159.88

Modems

Internal modems seem to be the rage. The new Micromodem IIe has been very popular of late, and for most users the 300 baud may be all you need. As always, research everything **before** you buy.

US ROBOTICS

Password

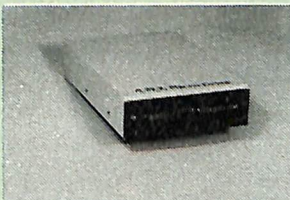


The **Password** is a direct connect originate/answer type modem with 0-300 & 1200 baud capability (Bell 212A compatible). Features include auto dial/answer, auto mode/ speed select, full/half duplex (local echo), DTR override, RS-232C pins 2 & 3 reversible & audio phone line monitor. Comes with an RS-232C cable, power supply & modular cable. RS-232C interface for Apple II optional.
Password \$379.88

AMT Micro Drive 1

\$199.88 UPS DELIVERED

AMT's **Micro Drive** is an Apple-compatible floppy disk drive that features a Teac direct-drive mechanism. There are 16 sectors per track (48 tracks/inch), with a total capacity of 140K bytes. Track access time is 6 milliseconds at 300RPM, with an impressive Mean Time Between Failure of over 8000 hours. Direct drive mechanisms eliminate wheels and belts, giving you precise timing and consistent performance over the life of the drive. An impressive and compact package.
AMT MicroDrive \$199.88



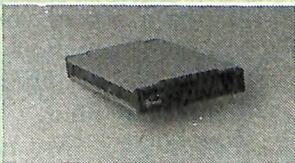
DC HAYES

Micromodem IIe

The **Micromodem IIe** is an originate/answer, auto dial/answer, full/half duplex internal modem for the Apple/Franklin systems. It includes a communications package (Smartcom I), modem board, cables and complete documentation. A superior product.
Micromodem IIe \$259.88

DC HAYES

Smartmodems



The **Smartmodems** are originate/answer, auto dial/answer, full/half duplex modems. There are two external "stack" modems: the 300 & the 300/1200 baud Modular phone cable & power supply included. (Apple RS-232C interface & cable are optional).
"Stack" Smartmodems

300 baud \$229.88
300/1200 baud \$539.88

NOVATION

AppleCat II

The **AppleCat II** is a 300 baud originate/answer, auto dial/answer, full/half duplex internal modem for the Apple/Franklin systems.
AppleCat II \$319.88

NOVATION

Smartcat (300 baud) \$199.88
Smartcat (1200 baud) \$499.88

MPI

RS-232C Card \$99.88

MICROSOFT

Premium Pack

The Microsoft **Premium Package** includes Z80 Softcard for CP/M[®], Videx's Videoterm for 80 column display, a 16K RAMcard and Thom Hogan's book on CP/M[®]. If you're thinking about an upgrade, this is it.
Premium Package \$474.88

If you've already got 64K RAM (Franklin, for example), get the Z80/Softcard Combo. Same spec's, but *without* 16K RAMcard.
Z80/Videx Combo \$444.88

Z80 Softcard \$249.88
16K RAMcard \$69.88

SATURN SYSTEMS

Accelerator II

The **Accelerator II** makes an Apple II run 3½ times faster than it normally does. We've tried it on our Franklin, and everyone's been impressed. High-speed 6502 processor and 64K memory. Comes with pre-boot.
Accelerator II \$479.88

RAMboards by Saturn

32K Memory Board \$169.88
64K Memory Board \$269.88
128K Memory Board \$379.88

VIDEX

VideoTerm

The **VideoTerm** 80-column card is something of a standard. It gives you 80-column display on the Apple/Franklin, with upper/lower case. It's a must for CP/M[®] or Pascal. Comes with or without the Soft Video. Switch, which lets you enable or disable the 80 columns from your keyboard.
VideoTerm w/switch \$234.88
VideoTerm w/out switch \$204.88

VIDEX

UltraTerm

The **UltraTerm** 80-column card gives you up to 160 columns as well as an 80-column display on the Apple/Franklin, with upper/lower

case. It's great for spreadsheets, word processing, or any application where 80 columns isn't enough. New video enhancements make it an exceptional package.

UltraTerm \$289.88

VIDEX

Enhancer II

Apple keyboard enhancer: type-ahead buffer, repeat, shift/cap lock, programmable keys, full ASCII (upper/lower case).
Enhancer II \$109.88

QUADRAM

eRAM

eRAM Board \$119.88

RANA SYSTEMS

Elite-1

The **Elite-1's** are single-sided, with 163K storage, 84ms access time & 13 or 16 sectoring. You also get an Enhancer Disk free, which lets you access 5 extra tracks. The **Controller Card** can run four drives—Apples, Rana's or whatever—in any combination. The **Elite-2's** are double-sided drives, **Elite-3's** are 80 track drives.

Elite-1 \$289.88
Elite-2 \$474.88
Elite-3 \$614.88
Controller \$104.88

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The Apple Clinic

by Earle Hancock

- Diagnosis by Disk
- Broken Arrow Keys
- Choosing a Monitor

The solution to a repair problem always begins with a diagnosis. This month I review two helpful tools available for computer diagnosis specific to the Apple II—the Brain Surgeon from Nikrom and Apple Cillin from XPS, Inc.

Both packages (recommended for the Apple II and II Plus—not the IIfx) are programs which must be loaded into the Apple. Therefore, your computer at least must be able to boot a disk.

The Brain Surgeon contains menu driven programs that test main logic board ROM and RAM, Applesoft and Integer ROM cards, lo-res and hi-res color, paddles and speakers, and disk speed.

Beginners will find the package easy to use. The documentation is clear and contains useful tips on general care and maintenance of computer equipment.

If your computer has a bad RAM in the lower 48K, the Brain Surgeon will pinpoint its location on the motherboard. Thus, bad ROMs can be tested and identified. The disk speed test and explanation of adjustment procedures are particularly useful and easy to follow.

Unfortunately, the Brain Surgeon does not have tests for the upper 16K of RAM found on the RAM card. It does, however, feature a D.C. Hayes Micromodem test that checks out all the functions of the modem (but only the Hayes brand), and a series of monitor alignment tests. The directions discourage amateur repair persons from performing these adjustments. Let me add my caution as well. The monitor yoke and “gun”

adjustments bring you into close proximity with 12,000 to 20,000 volts fed to the anode side of the picture tube (CRT). If you have any question about your ability to safely perform these adjustments, leave it to your TV repair person.

All in all, the Brain Surgeon is a good package and at \$45 may be a worthwhile addition to your software bank. The Brain Surgeon is available from Nikrom Technical Products, 25 Prospect St., Leominster, MA 01453.

Apple Cillin II is similar in application but wider in scope. The menu driven format is easy to use; one feature allows several tests to be linked together and then executed while the computer is unattended. Apple Cillin II tests all major components and can dump test results to your printer. Like the Brain Surgeon, Apple Cillin II does not test a RAM card or a disk controller card. Apple Cillin II is available for \$49.95 from XPS, Inc., 323 York Road, Carlisle, PA 17013.

Using these or other diagnostic programs will not answer all your diagnostic needs, but they will help. If *you* have a favorite diagnostic program, let me know about it and I will try to present it in this column.

Arrows and Fans

I am a big fan of *inCider*, and I have problems I need help in solving.

My biggest problem with my Apple II computer is that my arrow key does not register when I press it. In one of your articles you said to go to your local Apple dealer for repair

help. That's a problem; there are no dealers in Lima, Peru that I trust. If one did help me it would probably take six months to fix, and in that amount of time I could ship my Apple to a dealer in the States and get it back. I really don't want to do either of those things. Is there any possible way you could give me some information on how to make this repair myself? I think I have the courage to do it.

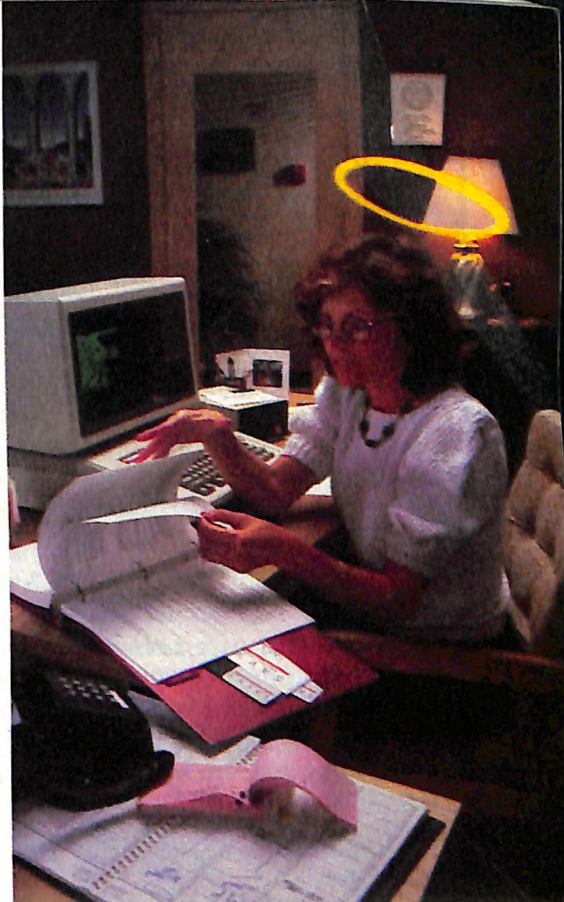
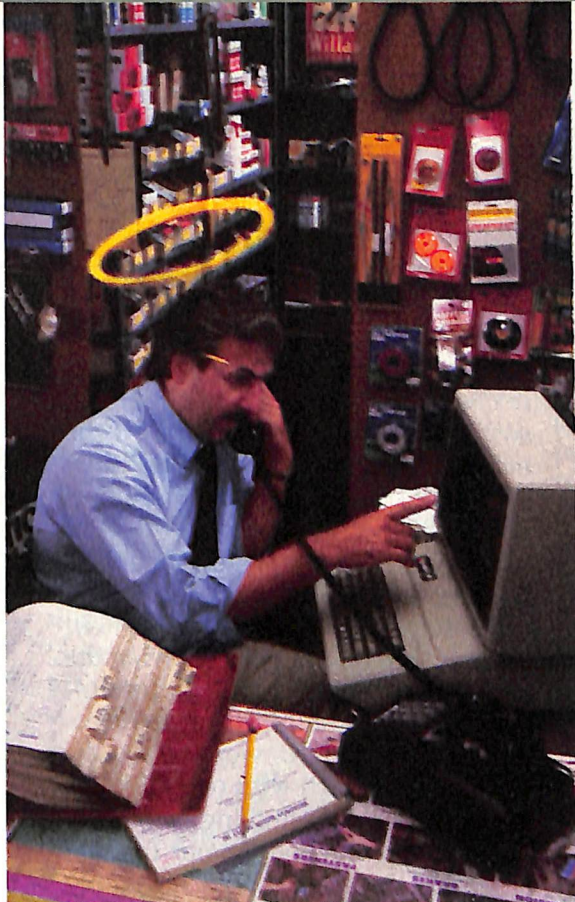
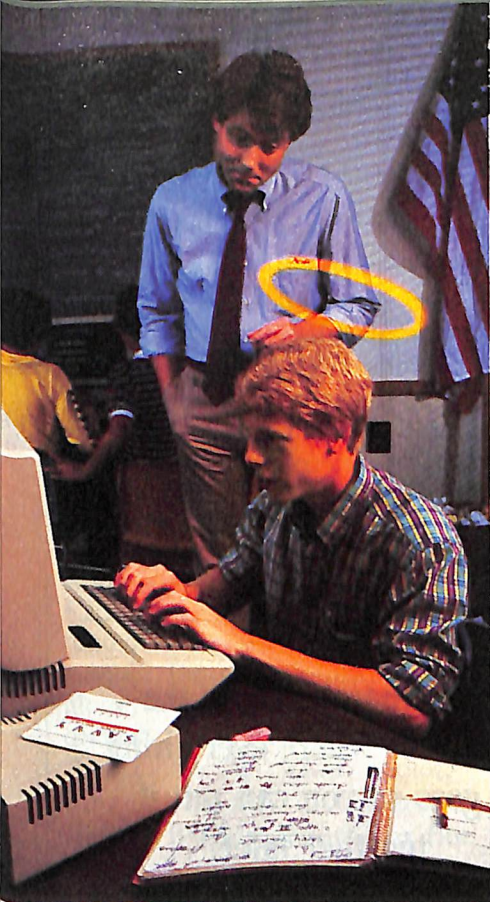
My next problem is that I have a fan hooked up to my Apple. The computer, monitor, and printer are all plugged into the outlets on the fan. All I need to do is flick on one switch to bring up the whole system. Sometimes after I turn it off, it won't turn back on right away. During my last visit to North America I asked a salesman from ComputerLand about this. He said that I probably turn it on too fast. When I got home I tried again slowly but it still didn't work. Why?

Name and address withheld by request.

There is a rule that says, “If a system works correctly all the time you (the operator) must be doing something wrong.”

Applying this logic to your situation, I conclude that your on/off

Earle Hancock has directed the microcomputer project at Minuteman Regional Vocational High School, Lexington, MA, for three years. He is a member of the Boston Computer Society and other computer organizations. Send your questions to him c/o *inCider*, Pine St., Peterborough, NH 03458.



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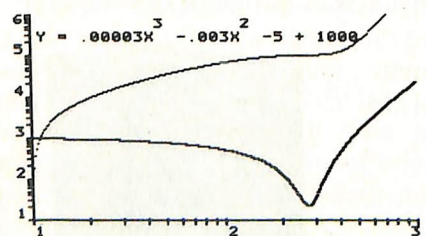
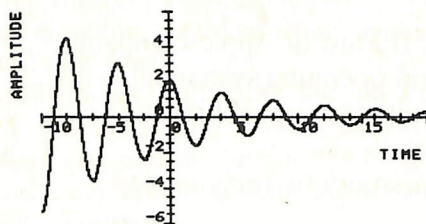
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switch will continue to fail (no matter how fast or slow you press it) because there is too much electrical demand—on power up—for the switch to handle. If you turn off the monitor and the printer and then find that, under the circumstances you describe, it continues to fail when hot, then the switch should be replaced.

To replace the fan on/off switch, open the fan housing by removing the screws that hold it together. Remember to unplug the fan from the electrical outlet before working on it. Replace the switch with one rated for the same current handling or higher. Switches like the one in your fan can be found in most electrical supply stores.

Make a drawing of the wires and where they connect on the switch. This will help you put it back together correctly. Test your repair job by having the switch in the "on" position as you plug it into the wall outlet. If you have a short in the switch, it should be far enough away from you so you won't get hurt if it arcs. Once all is well, install the fan in the computer and pat yourself on the back.

The arrow key problem is more complex. From your description I assume that all of the other keys work properly. That would place the problem with the key switch mechanism (this is usually the case when only one key is affected), and not with the passing of data from the keyboard to the computer.

To replace the key switch, remove the case from the Apple by loosening the screws around the edge of the bottom. There are 10 Phillips screws—four along the front just under the lip, one in each corner of the flat portion of the bottom and one between each corner on the sides only. Once the case is removed, carefully turn the computer over and raise the front (keyboard end) enough to find the keyboard encoder strap (multi-colored ribbon) that connects the keyboard encoder to the main logic board. Gently remove the ribbon cable plug from its socket in the main logic board. Remember to

make notes of where everything goes so you can put it together later. Look for the white dots—one on the plug and one on the socket.

Examine the underside of the keyboard to determine if your keys are the screw-in type or the solder type. If you see many small Phillips screws in the bottom of the board,

"Remember to make notes of where everything goes so you can put it together later."

you have the screw-in type. If there are no screws, you have the solder type.

I'm afraid there's no way to repair a non-functioning key switch. Ask your dealer which key switch mechanism is best for your Apple.

Once you have the correct parts, carefully pry off the keyboard encoder board from its perch on the keyboard. Identify the defective key switch and its connections on both sides of the board. Remove the solder from the connections and remove the screw if necessary. Replace the key switch and solder it into place. Install the keyboard encoder board and assemble the computer in the reverse order of the directions above.

Caution! Soldering—and especially un-soldering—require practice and a steady hand. Never let the soldering iron touch the circuit board for more than three seconds, or you may lift a trace and ruin the board. If you're unskilled with a soldering iron, let someone with proven soldering skills help you. If all else fails, an Apple computer dealer should be able to solve the problem either by replacing the key switch or the whole keyboard.

White, Green, Amber or Silver—Which Screen is for You?

The Apple Clinic has received many requests to recommend the ul-

timate monitor—one whose clear, sharp resolution will be suitable both for 80-column text and color graphics.

The three basic choices for video display are *composite video direct connect*, *composite video using an RF modulator* (making use of your existing color TV) and *RGB monitors*. Except for video games, the RF-modulated TV's resolution is not fine enough for 40 columns of text—let alone 80 columns. (For an excellent discussion of RGB technology, see "Don't Be a Video Idiot," by Timothy Daniel, in the August *in-Cider*.) RGB monitors are fine for color and for a limited amount of text viewing. But for extended text viewing, my choice is a high resolution (15 megahertz or higher) monochrome monitor, often called a "green screen" even though the color may be amber, white or green. For color

viewing a composite video screen is usually clear enough.

Two of these monitors cost less money than one RGB, and give you both excellent 80-column text and sharp color. The color of the text screen can make a difference (the new amber screens are very restful on the eyes), but the real issue is the sharpness of the letters and the lack of glare. I have yet to see an RGB monitor that produces satisfactory results.

Broken English

Have you ever seen OUT OF NEXT ERROR or SYNTAX ERROR OF MEMORY appear on your screen? Puzzling messages like these point to a motherboard problem. In this case the problem can be traced to an Applesoft ROM. The error messages are stored in ROM, and when they get as mixed up as the examples above, one of the

ROMs surely has failed.

To repair the problem, either install integrated circuits and test them by trial and error, or use a diagnostic program to identify the culprit right from the start.

An integrated circuit is composed of a case for protection, legs for connection to the outside world and a chip (the actual circuit). The chip contains transistors, diodes, and other components connected by a layering process. Movement caused by expansion and contraction from heating and cooling can break the tiny connections in the chip, causing chip failure. Why one chip fails and another does not has to do with the strength of the layers, the bond between them and the amount of stress applied as a result of the expansion and contraction. As you can see, keeping ICs cool is the best way to extend their life. ■

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the data basement

My family misses the basement playroom. It used to be a place where you could sit around and watch TV. It had a built-in bar, and was a fine place for adults to get away from the kids. The bookshelves were full of good reading, and occasionally you could even get some peace and quiet to just sit. That's all changed now. The bar has been moved to the living room, the TV doesn't work too well because of the interference, and the bookshelves are filled with printout paper, envelopes, labels, ribbons, printwheels and other computer peripherals.

The basement is now a data processing bureau.

Every three months or so we earn enough to buy another Apple if we want to. In fact, the first thing we did when we had earned enough was to buy a second, so the kids wouldn't keep coming down and using ours (they would persist in messing up the disk filing system!). A third quickly followed, so that we could handle all the work.

Needless to say, this "bureau" of ours is a part-time activity, but it is an extremely lucrative one—and we have Apple and VisiCalc to thank for it. In the office we have the two Apple II's, a high speed printer (a DEC LA180), a letter quality printer (Diablo), a modem and a few add-on cards that make life easier for us, as you will see.

My wife has a full and busy life managing two kids, so she is necessari-

by Archie Mason

ly part-time at the computing game. I work full-time at a major company so I can only work evenings and weekends. But this is plenty of time to have a second business that allows us to charge off part of the house (see your tax man before you jump into this), buy additional Apple equipment needed by the business (and sometimes not really needed by the business), and to try new and challenging things that we believe even the Apple company did not foresee for their "little" machine.

Getting Started

It all started in what must be a usual way—creating mailing labels for a friend. I imagine there are many Apples used around the world to do mailing labels for churches, clubs and small businesses. We had been doing this for a colleague of a neighbor who works for a large company. As soon as he asked the central downtown EDP department for help in preparing mailing labels to a part of his customer group, they told him that his division would be charged umpty-ump dollars for programming, that the lead time for the first batch would be four months, and that subsequent requests required one month's notice!

Since his project was "small" in the overall scheme of things, he couldn't get the budget (and couldn't wait four

months), so we came to do it for him. We were maintaining, and still do, a constantly changing list of about 2,500 names and addresses in a database, producing labels every month—and earning about \$150 each run.

Then our acquaintance was put in charge of the sales department budgets. One of his responsibilities was to produce three kinds of quarterly reports. The base data came to him in a deck of printout paper about eight inches thick. He and his clerks had to pull out the required information, perform several calculations on it, reformat it and then have it manually typed up for distribution to 113 sales territories—with a unique report for each! His entire department dreaded the beginning of a quarter, and they did not even have a word processor or a memory typewriter!

Naturally, he made the first approach to the EDP department again, and got much the same response as before. Since his division's structure and methodology are at variance with the company's, he got nowhere fast. He needed help.

Down to the Basement

So our basement became a service bureau. In December, when we ex-

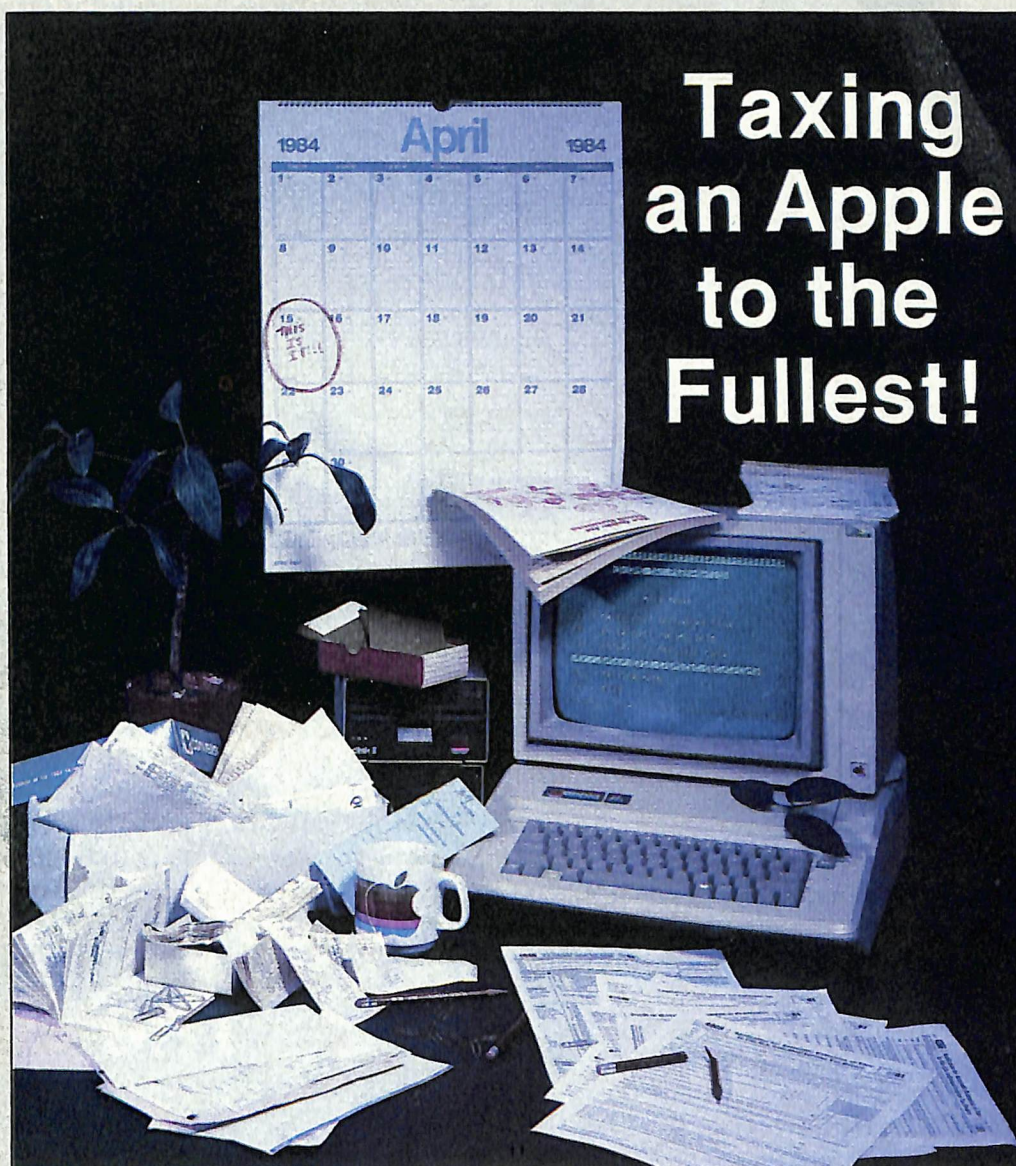
Write to the author, Archie Mason, at 10 Dzamba Grove, Stamford, CT 06903.

amined his requirements, we saw that with VisiCalc we could do all his work. I have been using VisiCalc since it first hit the microcomputer scene, and am still finding new and interesting ways of using it.

In brief, the reports all used two pieces of data, "massaged" several different ways. These were the last reported sales of a product (there were 25 of them) in a territory, and the product's sales for the same period last year. Once we had loaded the four quarters' sales figures for last year, we were ready to start. He needed first the projected sales for the coming year.

In his company they use all their experience and knowledge to develop a percentage by which the product could be expected to change in performance, up or (unfortunately) down. This percentage is applied to the last year total to produce the "target" for the next year. Then, allowing for seasonal variation, the result then is broken down into expectations for each quarter of the year.

The first report, delivered in mid-January, was the sales forecast by territory broken down by quarter, and was distributed to the 113 field offices. At the end of first quarter, after receiving the data for actual sales in the first three months, we produced the "performance against target" reports for the field, which also contained the revised targets for the rest of the year.



Taxing an Apple to the Fullest!

For many years, accountant Phil Conrad was a bookkeeper in a small company. Eventually he became the head of his department. He bought himself an Apple some time ago, knowing from his work experience that because he would use it for personal investment management, financial record keeping and tax preparation, he could deduct it from his taxes.

Phil's urge to be an entrepreneur was strong—for years he sought a field in which he could work for himself and "be beholden to no one." He now has done that, and is as happy as a clam.

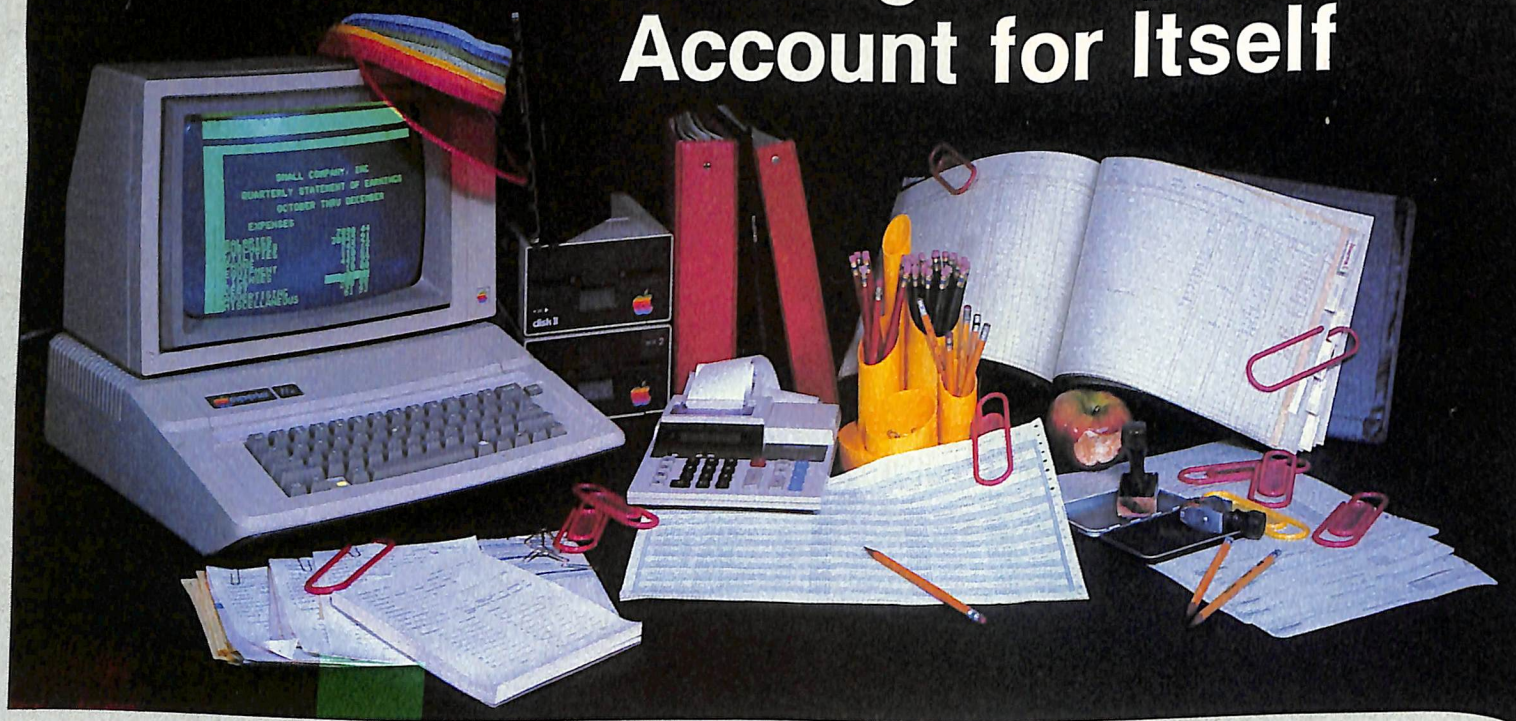
Phil now runs his own Personal Finance Management Service. In addition to personal financial consulting, wherein he works for investors and others who need ad-

vice and counsel, he manages the complete financial paperwork for his clients. He keeps their records in his Apple, updates them as required, and helps them prepare reports at tax time.

Since he is not accredited by the IRS he stops short of tax advice, but he can clarify the regular IRS information booklets, and can make sure his clients are correctly classifying their deductions and earnings. Using a software package he found (he doesn't like to endorse programs so he prefers not to specify which one) he prepares the full return with all supporting schedules.

Phil says of his Apple: "It started as a hobby, then became a tax deduction, and now is the source of virtually two-thirds of my income!" ■

Making an Apple Account for Itself

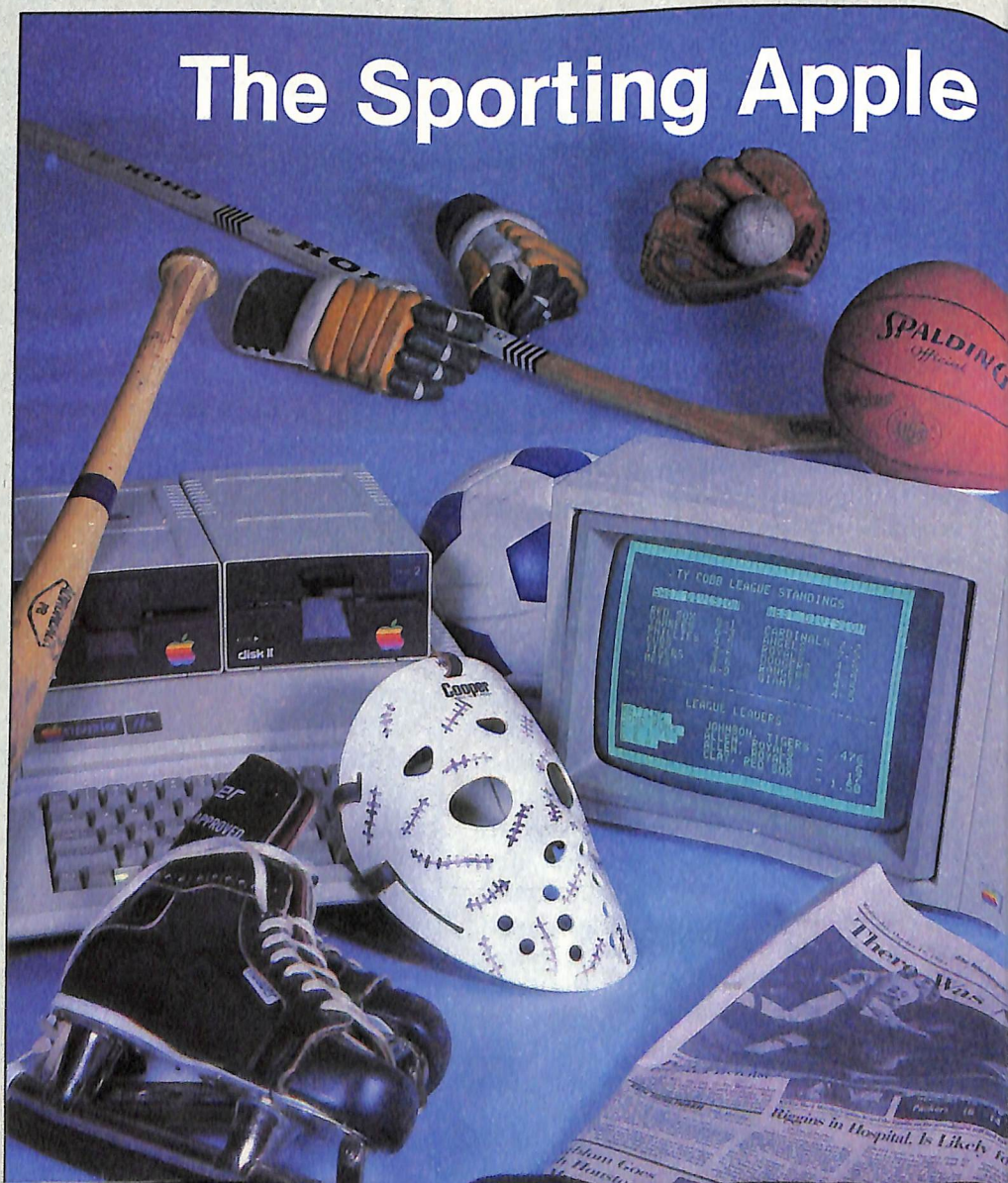


Bert Smith was a coach with the local youth soccer league. The size of the league had expanded from the 300 players it started with; it looked like it soon would have over 1600. All the paperwork and bookkeeping had been handled by the usual volunteer groups. Duties included hand addressing envelopes, typing up team lists and manually sorting out the registration forms. That was fine at the 300 level but impossible at 1600!

Bert offered to help out—with his trusty Apple. Using his standard database manager, he took over after parents filled out registration forms. Bert produced all the mailing labels, team lists, the coaches list, weekly game forms, and so on, on his Epson printer.

The first year he worked for free. Then he suggested to the league's board (who were overjoyed with the lifting of their

The Sporting Apple



Lucy D'Andrea used to work in a typing bureau—one of those places where companies send overflow copy typing when their staffs get too busy. She had had an Apple at home for a long time, a gift from her father on her eighteenth birthday. One day, a customer was complaining that the bookkeeping at his small company was a pain. The outside CPA who handled his quarterly reports was getting very expensive, and the paperwork load was increasing.

Lucy had an idea. She once had seen Accounting Plus used on an Apple in business school and had been impressed with the program's performance on such a relatively small computer. She went to her local computer store and took another look. It seemed fairly easy, and the illustrated output reports were terrific. She borrowed a set of these printouts and went to see the customer.

The pair then paid a visit to their CPA. The CPA agreed that the software would produce useful data so he endorsed the software.

Lucy started keeping the books for the company. Every Friday she

would collect the various source documents from the office such as check stubs, invoice copies, receiving reports and suppliers' bills. Over the weekend she would enter them into the system and return them to the company Monday morning. Each month she would prepare a full set of printouts and deliver them to the CPA, who would approve them and add his part of the work.

Lucy is getting married soon, and would like some time off. If Lucy can get two more clients (and she is talking to one already), she thinks she will offer the service full-time. She does not, of course, offer anything like the services of a CPA—just the necessary data entry and data management that is the basis of efficient and accurate bookkeeping. While Accounting Plus produces a full balance sheet if required, the company's business dictates that the many adjustments and judgment calls require a fully trained bookkeeper or accountant. However, as Lucy says: "Maybe if I went back to school and took accounting..." ■

paperwork burden) that perhaps they should pay him for his work. He quoted them a price for a fixed number of applications of the database (so many sets of labels during the season, so many team list revisions, and so on), and he priced it on a per player basis.

The league thought about it, increased their registration fees slightly to cover the extra cost and everyone was happy—especially the parents, who received clearly printed lists of players, with phone numbers for arranging car pooling, and the game schedules legibly and unambiguously printed!

Bert now does similar work for a girls' hockey league, the local Babe Ruth baseball league, the city-run basketball league, and receives new calls all the time. His cottage industry is thriving, and he is even talking of a second Apple and maybe hiring some help! ■

This process continued through the year until the final full-year report was produced.

One time our friend (now client) came to us with a special problem: He wanted to run a sales contest for the salespeople during a quarter. After devising a special analysis of the data we had been accumulating, we produced a special graphic printout illustrating the contest, and for that quarter did a special month-by-month analysis.

We manage the process on a territorial basis with sets of dedicated disks, eventually combining them into seven regions.

The Technicalities

We enter the basic data (with frequent SAVES for protection) into one big VisiCalc model. We then send it out to the individual disks in its relative pieces for the individual reports, while the basic data model is used for the national and regional reports.

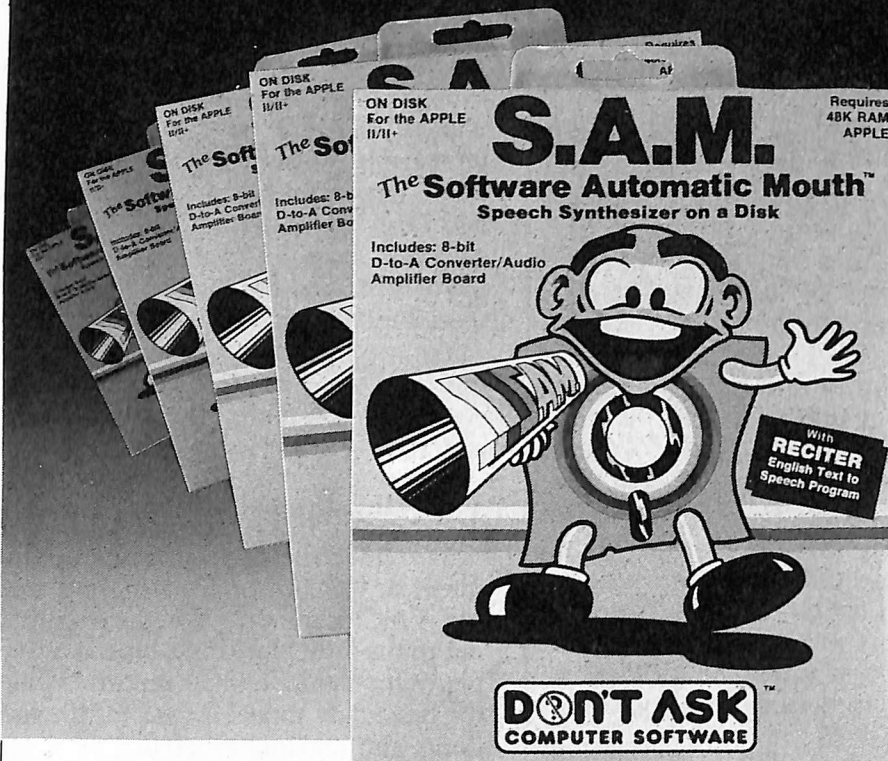
We use the DIF (data save) function extensively. The actual process is simple, but it calls for methodical work habits and much cross-checking, mostly by the computer. This is how it goes.

We get data on computer printouts from the downtown mainframe. Though they contain a great deal of information, only a relatively small part of it interests us. Essentially, we pull out the sales figures for each product for each of three months (apparently the mainframe doesn't know anything about quarters). Since each product may have in any month four or five figures, the first job is to total for the month, and then for the quarter.

Since we know the order in which the data can be found in the printouts, our first data entry "form" is a regional loading model which allows the straight keying of each of the individual figures. This way we can quickly teach a new helper what to look for, so that this essential but labor-intensive job can be done quickly and accurately.

Since the printout gives us a total figure for sales for the month for each territory, we have that loaded in at the top, too, so that when the model is recalculated we immediately can see if a comparison produces a red flag—as

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S.A.M. programmed by Mark Barton.

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when a figure was incorrectly typed. Our "keypunchers" are told to find errors immediately, and not go on until the column balances. This prevents a lot of checking back.

As the work progresses, the operator periodically DATA SAVES (using the /S# sequence) to the regional disk, so any electrical problems will not cause a loss of data. They save first to drive 1 and then to drive 2, creating a master and a backup as they go.

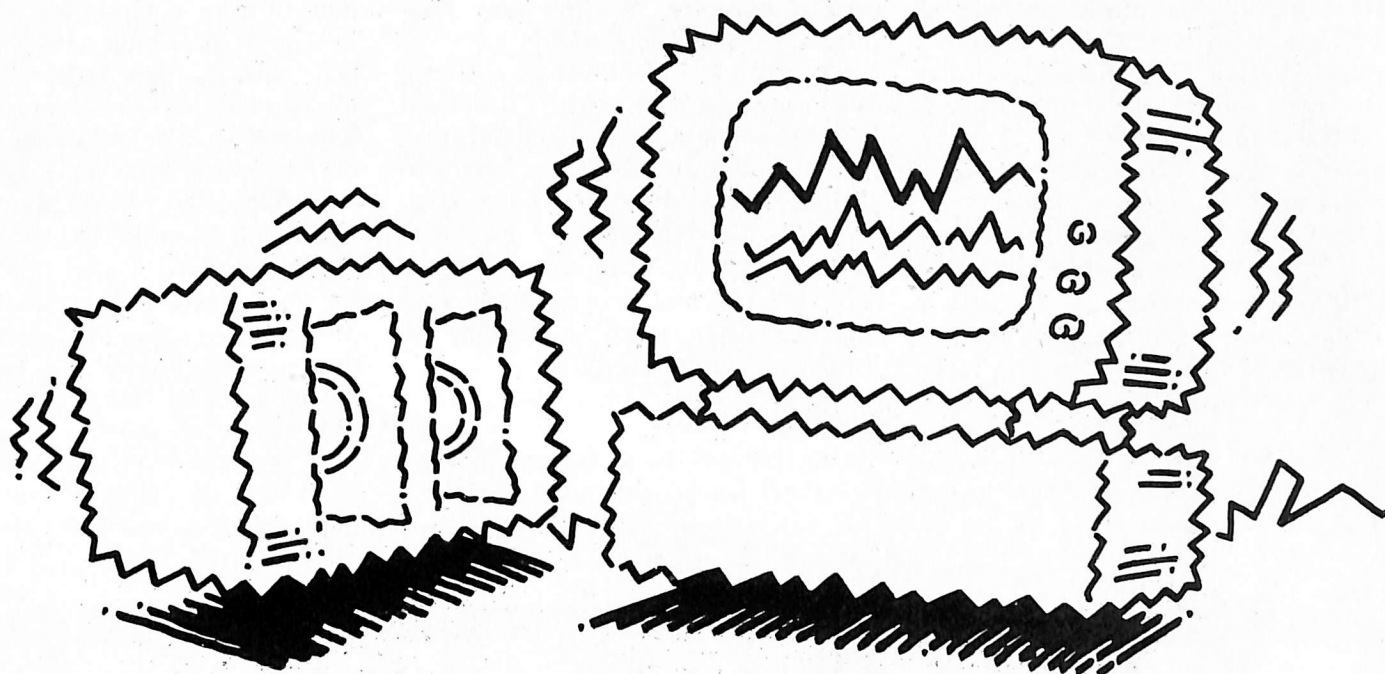
When this work is done and all the columns balance, the operator overlays onto the Data Collect model the Summarizer. This is a VisiCalc model on the Utilities Disk. Since the format of all the regional data collector models is identical, the Summarizer comes into the Data Collect model just two lines beneath it. When VisiCalc has finished the automatic recalc after loading, it totals the sizes for each month and produces the quarterly totals.

We conclude this first step with the "raw" data saved to seven master regional disks. This saved model is formatted in a series of columns with the summarized products, each representing all the territories in a region. Since this has been checked and double-checked, both by us and by VisiCalc, we know it is accurate.

Our present model is pushing the Apple's memory capacity, so we save just the Summarizer Model area to the regional disk, again as a DIF file. This saves only the resulting figures and none of the formulas. We /Clear the model and reload only the Summarizer, starting at A1 so that it occupies the top of the matrix.

Beneath this we load from the utilities disk a model called Report, representing the final report each territory will get. On the left side is a "bring down" area into which will come the figure from the first territory column above. Our operator moves to this column, enters the top coordinate from the territory column in the format (A6), /Replicates this down the column to the bottom of the report and then recalcs. Down comes the territory figure for each brand, the Report model takes it in and breaks it down as required, and the first territory report

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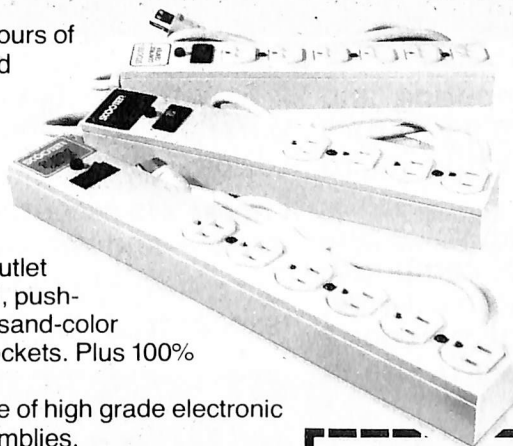
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is done!

Now the printing starts. We have our two Apples connected to the high speed printer through a switchbox—we can direct the output of either to the printer. Our arrangement lets either operator reach the switch. The first operator switches the printer over to the machine and prints. Each Apple also has a printer buffer installed, which quickly fills with the data, returning control to the keyboard. Switching disks, the report is DATA SAVED to the territory disk in case a second printing is required later.

As the work progresses the waiting time for an operator while the other prints becomes shorter as they get a rhythm going. Meanwhile, the stack of reports, at \$19.95 each, gets satisfyingly larger and larger!

The "Business" Apples

We bought the second Apple in the

basement when we realized that in a production mode we could cut the delivery time by more than half if we had two operators working together.

As time passed we equipped our Apples with Ramex 128 boards, and acquired the special VisiCalc modifier programs to take advantage of the increased capacity. We are now handling huge VisiCalc models!

The printer buffers were a godsend. We use the ones from Practical Peripherals, which are mounted on a card and adjust to parallel or serial and various baud rates. We have large green-on-black monitors to ease eye-strain, and spent extra money on the copy holders and proper lighting so that the laborious job of entering the data was as easy as possible.

Our Happy Client

Our "client" is so happy that he won't tell his people that the stuff is

done on an Apple. He allows them to believe there are ranks of gray cabinets with whirring tape drives in the "service bureau" he uses. He *could* tell them, but he's sure he would never be allowed to get an Apple for the department—computers are the "turf" of the EDP department, and he knows the hard time he would have.

We use local high school students to help with the data entry work. They love it, and there's many a resumé that will have "worked in a data processing bureau with computers" added to it.

We have been performing this particular job for nearly three years now, and have added several other jobs for the same client. Since his basic data is in our system (on the dozens of disks that are carefully filed away), we can do all kinds of things for him. He'll sometimes call with two questions: "Can we?" and "How much?". So far we have been able to provide good

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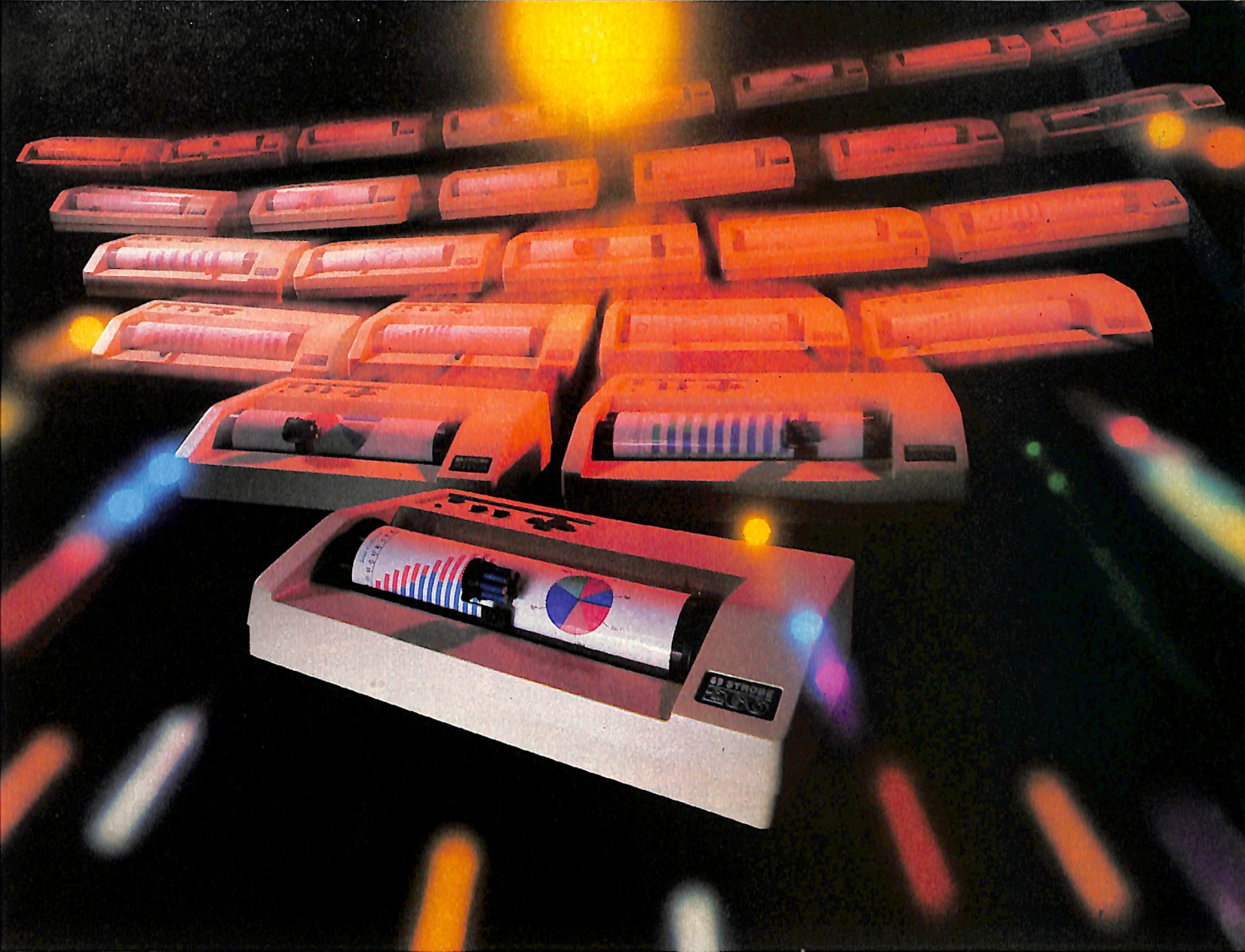
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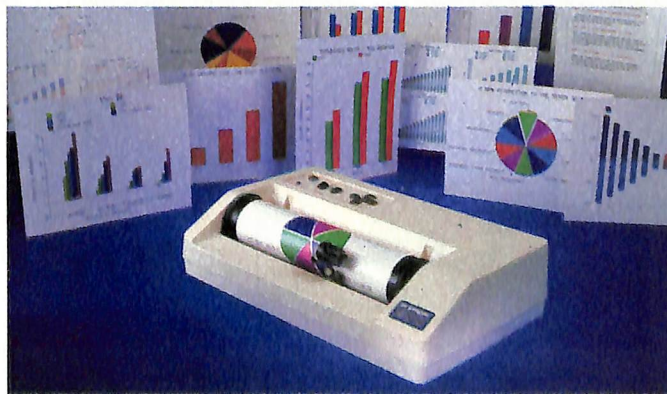
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answers to both!

A Growing Business

We now have two other companies for whom we do similar work. One is a small manufacturer, too small to even think of a computer for their office; the other is a private consultant for whom we do special number-crunching jobs. The manufacturer has asked us to consider handling all the bookkeeping for his company. I am now reviewing bookkeeping packages for the Apple so that I can quote him an estimate. Maybe we will at last get the books for our own little business into a computer. (Remember the shoemaker's kids, the last ones to get shoes?)

The Effect on Family Life

Does having a business at home hurt our family life? Not really—in fact, it brings us together in some ways. To see the whole family doing manual decol-

ating of a multi-part report series or sticking labels on hundreds of envelopes brings tears to the eyes (and a little money to the kids' pockets—they are business people, too)!

Potential customers will appreciate the fact that most of your work will be done after hours, when other suppliers have closed for the day. Also bear in mind that if you offer a service, it must be available when the customer wants it. We have had a couple of long weekends when plans had to be cancelled because of a rush job.

So how does it affect our lives? Well, it can get pretty hectic at times, especially when the "data deck" is a bit late and we have due dates to meet. We cannot kid ourselves that the keying in of the figures is anything but a pain. In the case of the job I cited, I'm talking about 113 times 25 times a six- or sev-

en-digit number every three months, with 100 percent accuracy mandatory. When VisiCalc goes to work and the formatted reports start rolling off the printer we get our first reward; the second comes when our invoice is paid!

Starting a Computer Business at Home

At meetings with members of InterCalc, the Spreadsheet Users Group, I am often asked how one can start to make money with the computer. Many of them hesitate to expand their system unless the computer already earns money. I can only say this in terms an expansion-minded Apple owner will understand: You have to find a need that is not filled yet.

Don't go after very large number-crunching jobs that would normally have to be done by a real service bureau. While your price might be right to the customer, you'll find that making it low is only possible by selling your labor at a ridiculous figure. Equally, there is no point in tackling small, one-time jobs in which the set-up time is perhaps more than 60 percent of the work.

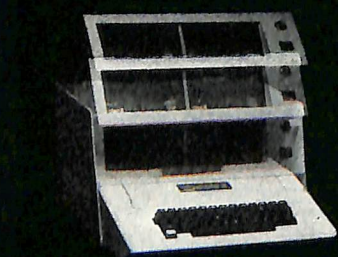
My advice would be to keep talking about it—to friends, acquaintances, and people you meet on the train. Eventually you'll get someone who asks, after hearing about your business aims, if there is a certain job that could be done by an Apple. To your delight you will realize that it can indeed. You'll make a deal and be on your way.

How can you prepare for this? My advice is to master three types of programs: a good word processor, a database manager and of course, VisiCalc or a similar spreadsheet program. With these three skills in your armory you can offer services in just about any small business area. And I'm sure that in other articles in this issue of *in-Cider* you'll find lots of food for thought.

Now my wife and I are wrestling with a bigger problem. The income from our "cottage industry" (do cottages have basement playrooms?) has built up to the point that with an increase in volume—a likely possibility—I could stop working for someone else and manage my own business full-time. Should I or shouldn't I? ■

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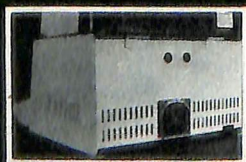
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Apples in Real Estate

Losing out on a sale in this business is more costly than in most. Private brokers using these two indispensable programs stand on firm ground.

by Paul Garrison

```

100 REM PROPERTY/PROSPECT FILE
110 REM BASIC-88
120 GOTO 200
130 PRINT "-----":RETURN
140 HOME:VTAB(10):RETURN
150 PRINT:INPUT "Press >RETURN":R$:RETURN
200 GOSUB 140:PRINT"Available properties and qualified prospects.":GOSUB 130:GOSUB 130:PRINT
202 PRINT 1,"Retrieve data":PRINT:PRINT 2,"Enter new data":GOSUB 130
205 INPUT "Which? ",WWW:GOSUB 140:ON WWW GOTO 210,2000
210 PRINT 1,"Check on properties":PRINT
220 PRINT 2,"Check on prospects":GOSUB 130
230 PRINT 3,"Exit program":GOSUB 130
240 INPUT "Which? ",WHICH:GOSUB 140:INPUT "Printout? (Y/N) ",Y$:GOSUB 140
245 ON WHICH GOTO 300,400,250
250 GOSUB 140:GOSUB 130:PRINT TAB(30)"End.":GOSUB 130:END
300 PRINT 1,"Residential properties":PRINT
310 PRINT 2,"Commercial properties":GOSUB 130
320 INPUT "Which? ",W:GOSUB 140
330 PRINT 1,"City location":PRINT
335 PRINT 2,"Suburban location":GOSUB 130
340 INPUT "Which? ",WW:GOSUB 140:IF WW=1 THEN 380 ELSE ON W GOTO 380,350
350 INPUT "Square footage? ",NB:PRINT
360 INPUT "Price? ",CP:GOSUB 140:GOTO 500
380 INPUT "Number of bedrooms? ",NB:PRINT
390 INPUT "Price? ",CP:GOSUB 140:GOTO 500
400 PRINT 1,"Prospect for residential property":PRINT
410 PRINT 2,"Prospect for commercial property":GOSUB 130
420 INPUT "Which? ",WWW:GOSUB 140:GOTO 330
500 IF WHICH=1 THEN R$="PROP"
505 IF WHICH=2 THEN R$="PROS"
510 IF W=1 THEN S$="RES"
515 IF W=2 THEN S$="COM"
520 IF WW=1 THEN T$="CITY"
521 IF WW=2 THEN T$="SUB"
525 IF WWW=1 THEN S$="RES"
526 IF WWW=2 THEN S$="COM"
530 RESTORE:GOTO 1000
600 PRINT:PRINT:PRINT"That is all.":PRINT:INPUT "Another run? (Y/N) ",YY$:RESTORE:W=0:WW=0:WWW=0
610 IF YY$="Y" THEN GOSUB 140:GOTO 210 ELSE END
1000 ON ERROR GOTO 600
1010 READ RR$,SS$,TT$,BB,BR$,PP,A$
1020 IF RR$=R$ THEN 1030 ELSE 1160
1030 IF SS$=S$ THEN 1040 ELSE 1160
1040 IF TT$=T$ THEN 1045 ELSE 1160
1045 IF WHICH=2 THEN 1070
1050 IF NB<BB THEN 1060 ELSE 1160
1060 IF CP>PP THEN 1100 ELSE 1160
1070 IF NB<BB THEN 1080 ELSE 1160
1080 IF CP<PP THEN 1100 ELSE 1160
1100 PRINT BB;BR$,"$";PP,A$
1110 IF YW$="Y" THEN LPRINT BB;BR$,"$";PP,A$:LPRINT ELSE 1160
1160 GOTO 1000
2000 GOSUB 140:PRINT"Enter new prospects or properties in any order":PRINT
2010 PRINT"starting at line number 5000.":PRINT:END
5000 DATA PROP,RES,CITY,5,BR,100000,2 STORY MODERN 111 MAIN STREET
5010 DATA PROP,RES,SUB,3,BR,90000,JOHN DOE 555 1212 LIKES OLDER HOUSES
5020 DATA PROP,COM,CITY,10000,SQ.FT.,500000,ABC CO. 555 1234 LIGHT MANUFACTURING
5030 DATA PROP,COM,CITY,5000,SQ.FT.,1000,STORE FOR RENT
5040 DATA PROP,RES,CITY,3,BR,80000,CALIF. RANCH STYLE 1.5 ACRES 2ND MORTG.OK
5050 DATA PROP,RES,SUB,2,BR,75000,HARRY SMITH 555 9876
5060 DATA PROP,RES,SUB,6,BR,125000,5 ACRES HORSE STALL WOODED
5070 DATA PROP,RES,SUB,4,BR,95000,GUEST HOUSE WITH KITCHEN
5080 DATA PROP,COM,CITY,25000,SQ.FT.,750000,WAREHOUSE
5090 DATA PROP,RES,CITY,1,BR,45000,MARY JONES 555 7454 WANTS CONDO
5100 DATA PROP,RES,CITY,3,BR,125000,LARRY BROWN 555 3456 NEEDS STUDIO

```

Listing 1. The real estate program that maintains lists of available properties and qualified prospects.

With Apples ripening just about everywhere these days, there's no compelling reason why they should not be welcomed by real estate brokers—especially those who operate small, individually-owned operations. And as you know, a computer's usefulness depends entirely on the software with which it is being used.

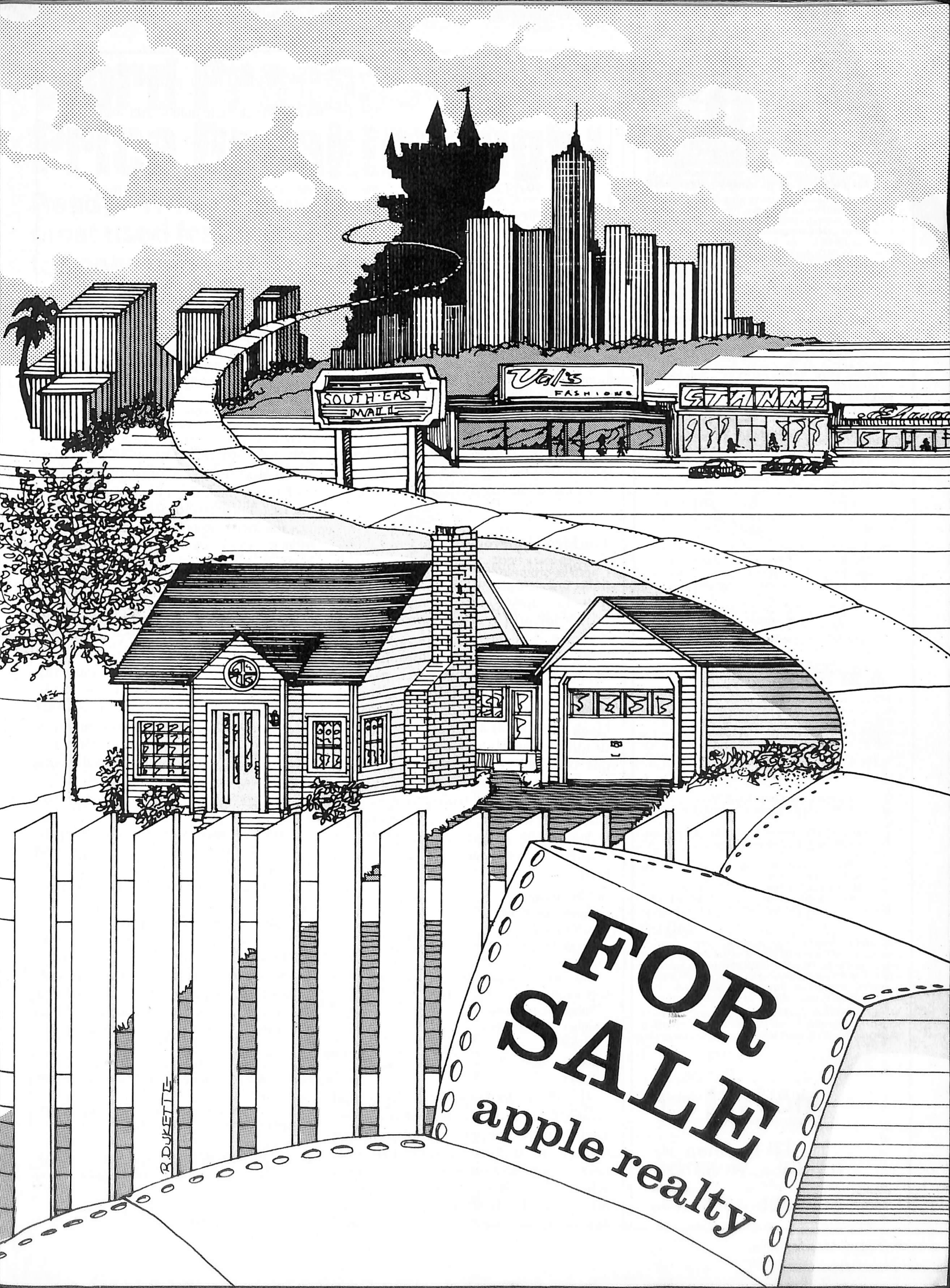
In spite of the real-estate-oriented commercial software presently available, you may find that you can do as well, and often better, by designing programs tailored to *your* particular needs. Such programs can be designed to perform a wide variety of chores:

- Keep an up-to-date list of prospects and their requirements.
- Keep an up-to-date list of residential and commercial properties.
- Determine approximate mortgage payments based on current interest rates and the life of the mortgage.
- Determine the relative advantages or disadvantages of renting versus buying.
- Determine which kind of your advertising is proving to produce maximum returns.
- Keeping track of the status of tenants in rental properties.

And then, of course, there are the chores that face every business: book-keeping, billing, figuring taxes, and so on.

Rather than present you with do-it-yourself remedies for all of these prob-

Write to the author, Paul Garrison, at PO Box 2490, Santa Fe, NM 87501.



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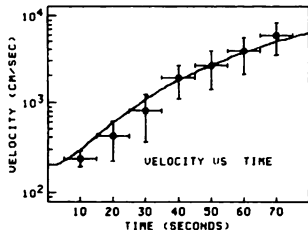
AMPERGRAPH is a powerful, easy-to-use relocatable graphics utility for the Apple II +/e. AMPERGRAPH adds twenty-two Applesoft commands that allow effortless generation of professional-looking plots of scientific or financial data. All of the necessary scaling and screen formatting is accomplished with just a few, simple Applesoft lines.

Unlike most other plotting systems for the Apple II which are stand-alone systems, the AMPERGRAPH utility provides extended BASIC graphics language macros that you can use directly in your own Applesoft programs. The additional commands are &SCALE, &LIMIT, &AXES, &GRID, &FRAME, &LOG X, &LOG Y, &LABEL AXES, &LABEL, &V LABEL, &CENTER LABEL, &CENTER V LABEL, &DRAW, &PENUP, &CROSS, &OPEN SQUARE, &CLOSED SQUARE, &OPEN CIRCLE, &CLOSED CIRCLE, &ERROR BARS, &DUMP (to dump the graph on a Silentyper printer) and &*DUMP (to link with AMERDUMP, see below).

\$45.00

SAMPLE AMPERGRAPH PROGRAM LISTING:

```
10 &SCALE, 0, 80, 80, 13000
15 LX$ = "TIME (SECONDS)":LY$ = "VELOCITY
(CM/SEC)"
20 &LOG Y: &LABEL AXES, 10, 10
25 LABEL$ = "VELOCITY VS. TIME":&LABEL, 30,
200
30 FOR T = 0 TO 80:&DRAW, T, 150 + T/2:NEXT T
35 FOR T = 10 TO 70 STEP 10
40 &CLOSED SQUARE, T,
(150 + T/2)*(8 + .4* RND(3))
45 &ERROR BARS, 5, T/2/2
50 NEXT T:&DUMP
```



AMPERDUMP

AMPERDUMP is a high-resolution graphics dump utility which can be used either in menu-driven mode, or directly from your Applesoft program, with, or without AMPERGRAPH. The following printers will work with AMPERDUMP: Epson MX-80, FX-80, MX-100; Apple DMP, NEC PC-8023A-C, C. ITOH 1550, 8510A/B, 8600. AMPERDUMP offers many features which are not available in other graphics dump routines:

- Horizontal magnifications: 3 with Epson printers (2.33 to 6.99 inches); 12 with all others (1.75 to 7.78 inches)
- Vertical magnifications: 9 with Epson printers (0.88 to 7.96 inches); 6 with all others (1.33 to 8.00 inches)
- Horizontal and vertical magnifications can be specified independently.
- Normal / Inverse dumps
- Adjustable horizontal tab
- Compatible with AMPERGRAPH
- Fast
- Easy to use
- Relocatable

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The AMPERGRAPH and AMPERDUMP graphics utilities require an Apple II +/e (or Apple II with language card). The AMPERDUMP utility requires one of the following interface cards: Epson, Apple, Grappler, Interactive Structures, Mountain Computer, Epson Type2, Tymac, or Microbuffer II.

AMPERGRAPH and AMPERDUMP are available from your dealer or order direct. Include \$2.00 for shipping and handling; Wisconsin residents add 5% sales tax.

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2 BR	\$ 75000	HARRY SMITH 555 9876

Figure. The top portion resulted when I asked for residential properties located in the city, providing a minimum of three bedrooms and costing \$100,000 or less. In the center printout, I asked for prospects looking for commercial city property with 8,000 or more square feet, costing not more than \$500,000. In the bottom portion, I asked for prospects looking for suburban or country homes with two or more bedrooms, costing under \$100,000.

lems, I offer you two programs that I believe can be useful either as they are, or as modified to your special needs.

Tracking Hot Properties

The first program is a simplified database program designed to maintain an up-to-date list of available properties and qualified prospects. In devising it I purposely have avoided using the method that automatically creates a separate data file which stores all input information. Instead, the input data must be typed into the DATA block (lines 5000 and up). This method simplifies the chore of checking what has been previously stored and what needs updating or deleting. It does make data input a trifle more complicated, but that's a small price to pay.

When the program is activated, it displays a series of "either/or" questions:

- Retrieve data?
- Enter new data?
- Check on properties?
- Check on prospects?
- Residential properties?
- Commercial properties?
- City location?
- Suburban location?
- Number of Bedrooms?
- Price?
- Square footage?
- Price?

If you're looking for a qualified prospect for a given piece of property, keying in the property parameters will display all financially qualified prospects whose space requirements match what you're offering. To display properties that closely fit a prospect's needs, key in the prospect's requirements and

the program will display all properties that could satisfy those requirements.

Lines 5000 through 5100 are sample entries. PROP stands for property. PROS stands for prospect. RES stands for residence. COM stands for commercial. CITY is self-explanatory. SUB stands for suburbs or country. BR stands for bedrooms, and SQ.FT. stands for square footage. The following figure represents either the asking price (in the case of properties) or the price a prospect will pay. The rest of the line can contain whatever information you wish. You can enter prospects and properties in any order, but the form of entry must be like so: DATA PROP, RES, CITY, 5, BR, 90000, and miscellaneous information (without commas!). Also, do *not* use commas in the price figures (100000, not 100,000).

You can use lines from 5000 up to over 60,000 to enter property and prospect information, and if you regularly update it, it should prove to be a useful program.

The second program determines data related to mortgages. It can determine the absolute minimum payment, or one based on a fixed period, plus the total payoff and total interest for a first and second mortgage. When it is executed, it asks these questions:

- (1) Do you want to examine the data for a first mortgage?
- (2) Do you want to examine data for both mortgages?
- Type 1 or 2
- (1) Do you want to find the minimum payment?
- (2) Do you want to find the payment for a fixed period?
- Type 1 or 2
- Total price of property?

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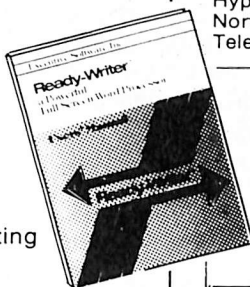
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- ✓ Search for or replace any string of characters
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- ✓ Write blocks of text to a file on your disk
- ✓ Read files from your disk into the file you are editing
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- ✓ Word wrap mode to start new lines automatically
- ✓ Reform paragraphs when words are added or deleted
- ✓ Set left and right margins
- ✓ Switch from overwriting text to inserting characters
- ✓ Use print formatting commands to set line spacing, paper length top and bottom margins, page offset, page breaks and conditional page breaks
- ✓ Print page headings and footings, set starting page number, omit page numbers



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```

1100 REM MORTGAGE DATA
110 REM BASIC-80
120 GOTO 190
130 PRINT "-----":RETURN
140 HOME:UTAB(10):RETURN
150 PRINT:INPUT "Press >RETURN< ",R$:RETURN
190 GOSUB 140
200 PRINT "This program calculates data for first":PRINT
210 PRINT "second mortgages. Do you want to examine":PRINT
220 PRINT "the data for a 1st mortgage only (1) or":PRINT
230 PRINT "for both mortgages (2)?:GOSUB 130
240 INPUT "Type 1 or 2 ",M1:GOSUB 140
250 PRINT 1,"Do you want to find the minimum payment?":PRINT
260 PRINT 2,"or the payment for a fixed period?:GOSUB 130
270 INPUT "Type 1 or 2 ",WHICH:GOSUB 140
300 INPUT "Total price of property? $",PROP:PRINT
310 INPUT "Amount of downpayment? $",DOWN:PRINT:PRIN=PROP-DOWN
312 IF M1=1 THEN 320
315 INPUT "Amount of 2nd mortgage? $",MORT:PRINT:PRIN=PRIN-MORT:GOSUB 130
316 PRINT "Amount of 1st mortgage: $":PRIN:GOSUB 130
320 INPUT "Annual interest rate, 1st mortgage? %",INTEREST:INTEREST=INTEREST/100
330 IF WHICH=2 THEN 600
340 MIN=PRIN*INTEREST/12:MIN=INT(MIN*100+.5)/100:GOSUB 130
350 PRINT "A monthly payment of $",MIN;" will cover only the interest.":PRINT
360 INPUT "How much do you feel you can pay? $",PAY
365 MONTH=1
370 F=INTEREST/12:BAL=F*PRIN+PRIN-PAY
375 MONTH=MONTH+1
376 BAL=BAL*F+BAL-PAY
380 IF BAL<PAY THEN 388
385 IF BAL=PAY THEN 375
388 BAL=INT(BAL*100+.5)/100
390 GOSUB 130:PRINT "At that rate you will need to make ",MONTH;" payments":PRINT
400 PRINT "of $",PAY;" each, plus a last payment of $":BAL:GOSUB 130
405 TOTAL=PAY*MONTH+BAL:INTER=TOTAL-PRIN
410 PRINT "The total cost of the mortgage is $":TOTAL;" with the":PRINT
420 PRINT "interest amounting to $":INTER:GOSUB 130:GOSUB 150:GOSUB 140
430 IF M1=2 THEN 450 ELSE 440
440 GOSUB 140:GOSUB 130:PRINT TAB(30)"End.":GOSUB 130:END
450 GOSUB 140
460 INPUT "Annual 2nd mortgage interest rate? %",I2:PRINT
470 INPUT "For how many years? ",YEAR:GOSUB 130
480 M=((MORT*(12/100)*YEAR)+MORT)/YEAR/12:M=INT(M*100+.5)/100
490 PRINT "Monthly 2nd mortgage payment will be $":M:PRINT:TOT2=M*(YEAR*12)
500 PRINT "Total 2nd mortgage payoff is $":TOT2:GOSUB 150:GOSUB 140
510 PRINT "Total payments, 1st & 2nd mortgage combined: $":M+PAY:PRINT
520 PRINT "Total payoff, both loans: $":TOTAL+TOT2:GOSUB 150:GOTO 440
600 GOSUB 130:INPUT "The 1st mortgage is to be for how many years? ",PERIOD:PRINT
610 M1=((PRIN*INTEREST*PERIOD)+PRIN)/PERIOD/12:M1=INT(M1*100+.5)/100:PAY=M1
615 GOSUB 130:PRINT "Your monthly payment will be $":M1:GOSUB 130
620 TOTAL1=M1*(PERIOD*12):INTER1=TOTAL1-PRIN:TOTAL=TOTAL1:INTER=INTER1:GOSUB 130:GOTO 410

```

Listing 2.

The real estate program that calculates mortgage payments and interest rates.

1) Applesoft does not support variable designations of more than two characters. Thus, you must change all variables using more than two characters. For instance, WHICH in line 240 in the Property/Prospect file program and in line 270 in the Mortgage program must be changed to something like WH or simply W.

2) Applesoft does not support the ELSE statement used in the context of IF..THEN..ELSE in lines 340, 610, 1020, 1030, 1040, 1050, 1060, 1070, 1080 and 1110 in the Property/Prospect program and in line 430 in the mortgage program. To remedy that situation, break the statement into two separate statements. For instance:

```
100 IF A = 1 THEN 200 ELSE 300
```

should be changed to:

```
100 IF A = 1 THEN 200
```

```
110 GOTO 300
```

which will take care of that problem.

3) In Applesoft the statement in the Property/Prospect program in line 1000, ON ERROR GOTO 600 must be changed to ONERR GOTO 600.

4) Applesoft does not support the LPRINT command used in line 1110 in the Property/Prospect program. That line must be changed to read:

```
1110 IF YN$ = "Y" THEN 1112
```

```
1111 GOTO 1160
```

```
1112 PR#1:PRINT BB;BR$,"$";PP,A$:PR#0:
GOTO 1000
```

in order to turn the line printer on and off.

I believe all else can remain as is. ■

Amount of down payment?
Amount of second mortgage? (if applicable)
Amount of first mortgage?
Annual interest rate, first mortgage?
The first mortgage is for how many years? (if applicable)

The program responds either with the absolute minimum monthly payment (covering only the interest) or the monthly payment based on the selected number of years, plus the total payoff and the total interest. If you select

the second mortgage option, it displays the monthly payments, the payoff and total interest, followed by the amount of the combined payments during the life of the second mortgage, the total payoff and total interest.

The program, as reproduced here, is written in the Apple version of Basic-80 (MBasic), using the WordStar word processing program. To translate it into Applesoft, you must make certain minor changes.

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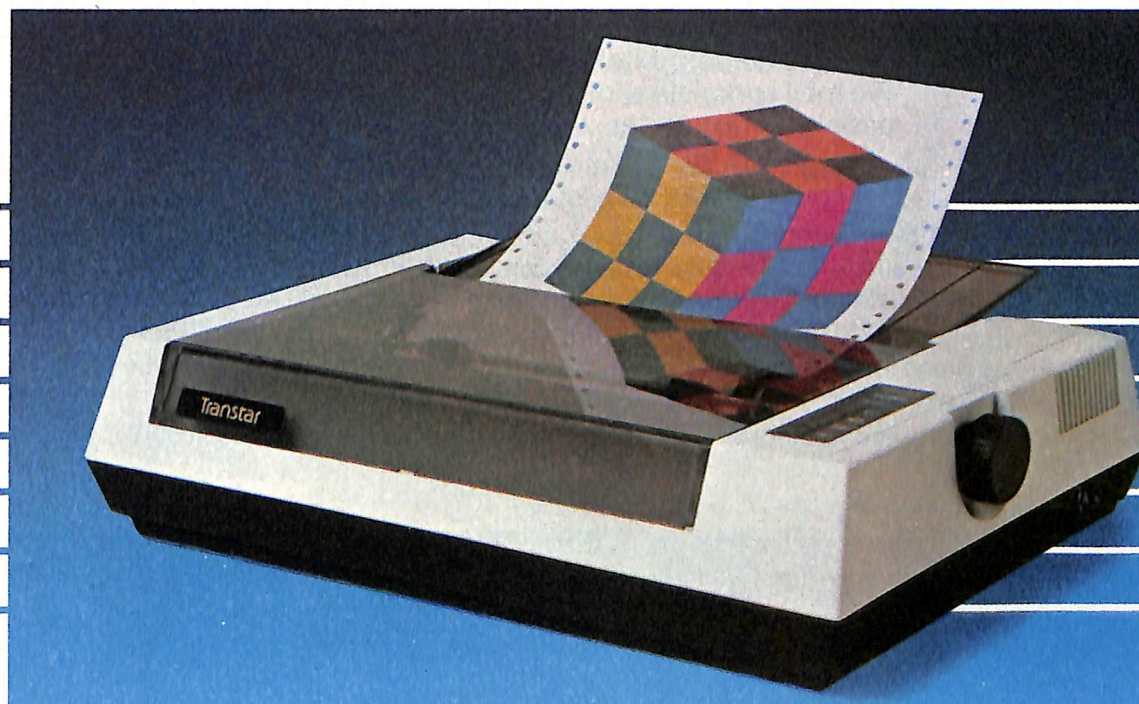
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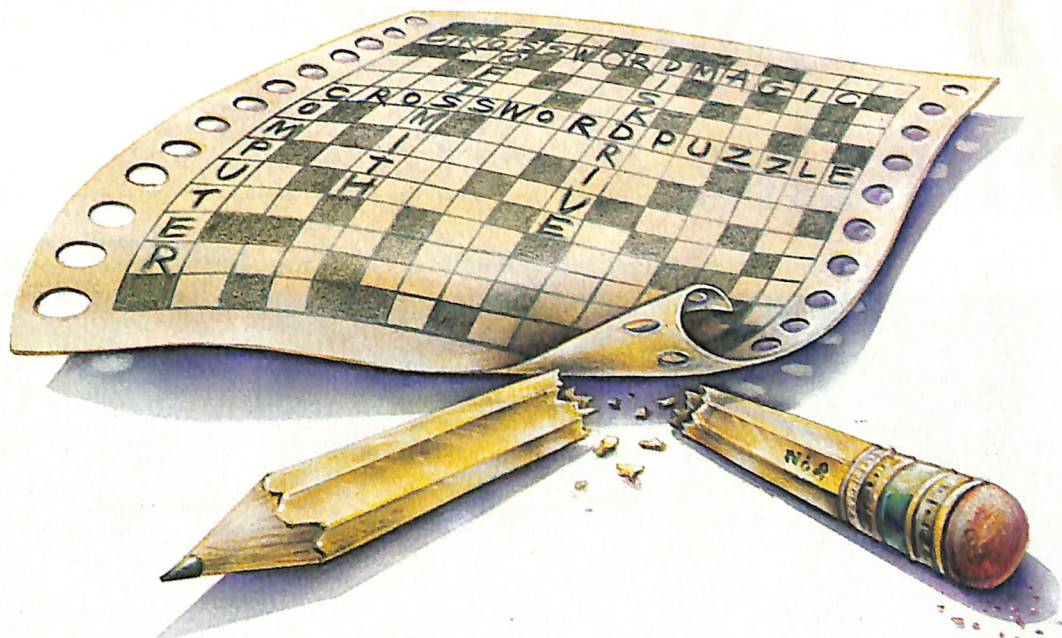
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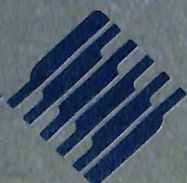
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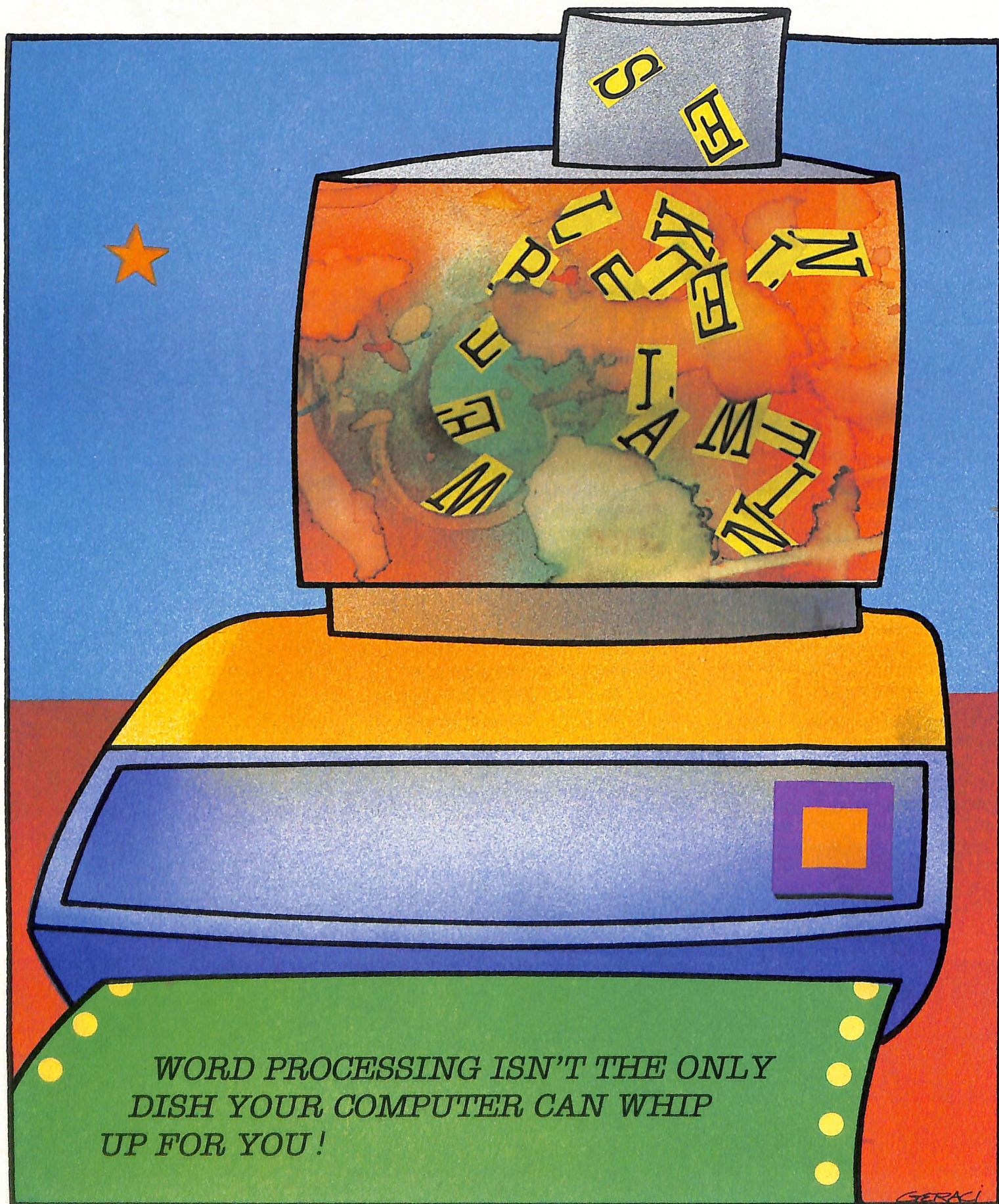
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The Computer and the Writer



When you think of professional writers using computers, you probably think primarily of word processing and the programs that transform Apples into more or less sophisticated typewriters. Every computer-equipped writer I know agrees that word processors represent a vast improvement over typewriters, but few agree on which program is best. I have tried three—Spellbinder, EasyWriter and WordStar—and have opted for the latter as being most versatile.

But enough about word processors. This article deals with a few other ways in which a computer can be a valuable tool for writers. Writers, of course, are not only those who write the great American novels but also those who write nonfiction books, ar-

ticles, screenplays, TV commercials, advertising copy, press releases, brochures—you name it.

Most, if not all, have certain recurring problems in common. One has to do with determining the relationship between typed copy and printed material in terms of the number of printed pages or column inches, because our assignments frequently call for a given amount of printed material. The calculations involved are not particularly complicated. Still, if you need to perform many calculations to determine the different results produced by, say, different typefaces or type sizes, you may spend quite a bit of time getting the results you're looking for.

The program in Listing 1 deals with this problem. In lines 220 through 270

you're given four choices of program use plus the option to exit the program. If you opt for "Typed copy to printed pages," you're asked to key in the number of words per typed page, the number of words per printed page and the number of printed pages specified in the assignment or contract. It then displays the percent of a printed page represented by a typed page and the number of typed pages required to fill the assignment. Next it asks that you key in the number of typed pages currently on hand, responding with the number of printed pages that will result from the typed material on hand.

If you opt for "Typed copy to printed columns," you're asked to key in the number of characters per typed line and the number of characters per column line, plus the number of lines per typed page and the number of lines per printed column. The response produces the relationship between typed and column lines and typed pages and full column. You're then asked to enter the number of columns per page and the number of typed pages on hand, resulting in the number of typed pages per column page and the number of column pages produced by the typed pages on hand.

The other two options are the reverse of the above, requiring that you input the data related to printed material and producing results in terms of typed copy.

The next program deals with a subject that tends to be a big pain for those of us who deal with written material that includes a large number of illustrations. This is especially true in the case of nonfiction books, where we'll often use hundreds of illustrations, and where, for each one, we need to provide a caption. The problems involved are several. Often some illustrations may be late in arriving, or one may suddenly show up after all captions have already been numbered and written. In addition, many publishers require that captions are supplied in two forms. One is to be pasted to the

```

1100 REM WORD COUNT
110 REM BASIC-80
120 GOTO 200
130 PRINT "-----":RETURN
140 HOME:UTAB(10):RETURN
150 PRINT:INPUT "Press >RETURN " ,R$:RETURN
160 GOSUB 140:GOSUB 130:PRINT TAB(30)"End.":GOSUB 130:END
200 GOSUB 140:GOSUB 130:PRINT "This program determines the relationship between":PRINT
210 PRINT "typed copy and printed pages or columns.":GOSUB 130:GOSUB 150:GOSUB 140
220 PRINT "Menu.":GOSUB 130
230 PRINT 1,"Typed copy to printed pages":PRINT
240 PRINT 2,"Typed copy to printed columns":PRINT
250 PRINT 3,"Printed pages to typed copy":PRINT
260 PRINT 4,"Printed columns to typed pages":GOSUB 130
270 PRINT 5,"Exit program":GOSUB 130:INPUT "Which? " ,WHICH:GOSUB 140
280 ON WHICH GOTO 1000,2000,3000,4000,160
1000 INPUT "Number of words per typed page? " ,WTP:PRINT
1010 INPUT "Number of words per printed page? " ,WPP:GOSUB 130
1020 INPUT "Number of printed pages needed? " ,PPN:GOSUB 130
1030 TP=WTP/WPP:TP=INT(TPX10+.5)/10:TPN=PPN/TP:TPN=INT(TPNX10+.5)/10
1040 PRINT "One typed page represents " ,TP; " of a printed page.":PRINT
1050 PRINT "You need " ,TPN; " typed pages to produce " ,PPN; " printed pages."
1060 GOSUB 130
1070 INPUT "Number of typed pages on hand? " ,POH:GOSUB 130
1080 PP=POHXWTP/WPP:PP=INT(PPX10+.5)/10
1090 PRINT "POH; " typed pages produce " ,PP; " printed pages.":GOSUB 130:GOSUB 150
1100 GOSUB 140:GOTO 220
2000 INPUT "Number of characters (incl.blanks) per typed line? " ,CTL:PRINT
2010 INPUT "Number of characters (incl.blanks) per column line? " ,CCL:GOSUB 130
2020 INPUT "Number of lines (incl.blank lines) per typed page? " ,LTP:PRINT
2030 INPUT "Number of lines (incl.blank lines) per printed column? " ,LPC:GOSUB 130
2040 CL=CTL/CCL:CL=INT(CLX10+.5)/10:CP=LTP/LPC:CP=INT(CPX10+.5)/10
2050 PRINT "One typed line represents " ,CL; " column lines.":PRINT
2060 PRINT "One typed page represents " ,CP; " columns.":GOSUB 130
2070 INPUT "How many columns per page? " ,CPP:PRINT
2080 INPUT "Number of typed pages on hand? " ,POH:GOSUB 130
2090 CP=CCLXCPP:CT=CTLXLTP:PCP=CP/CT:PCP=INT(PCPX10+.5)/10:ACP=POH/PCP:ACP=INT(ACPX10+.5)/10
2100 PRINT "It takes " ,PCP; " typed pages for one printed column page":PRINT
2110 PRINT "Copy on hand will produce " ,ACP; " printed column pages."
2120 GOSUB 130:GOSUB 150:GOSUB 140:GOTO 220
3000 INPUT "Number of printed pages needed? " ,NPN:PRINT
3010 INPUT "Number of words per printed page? " ,WPP:GOSUB 130
3020 INPUT "Number of words per typed page? " ,WTP:GOSUB 130
3030 PP=WPP/WTPXNPN:PP=INT(PPX10+.5)/10
3040 PRINT "You need " ,PP; " typed pages for " ,NPN; " printed pages."
3050 GOSUB 130:GOSUB 150:GOSUB 140:GOTO 220
4000 INPUT "Number of columns needed? " ,NCN:PRINT
4010 INPUT "Number of lines per column? " ,LPC:PRINT
4020 INPUT "Number of characters per column line? " ,CPL:GOSUB 130
4030 INPUT "Number of characters per typed line? " ,CTL:PRINT
4040 INPUT "Number of lines per typed page? " ,LTP:GOSUB 130
4050 TNC=NCNXLPCXCTL:TTC=CTLXLTP:TP=TNC/TTC:TP=INT(TPX10+.5)/10
4060 PRINT "You need " ,TP; " typed pages to fill " ,NCN; " columns."
4070 GOSUB 130:GOSUB 150:GOSUB 140:GOTO 220

```

Listing 1. The program that displays the percentage of a printed page represented by a typed page, and the number of typed pages required to complete a particular assignment.

Address correspondence to Paul Garrison, PO Box 2490, Santa Fe, NM 87501.


```

100 REM CAPTIONS FOR ILLUSTRATIONS
110 GOSUB 130:GOTO 1000
120 PRINT"-----":RE
TURN
130 HOME:VTAB(10):RETURN
140 PRINT:INPUT "Press >RETURN ",R$:RETURN
1000 GOSUB 120
1010 PRINT"This program types captions for illustrations":GOSUB 120
1020 PRINT"Use DATA lines starting at line 2000 in the following format:":PRINT
1030 PRINT"DATA '5/7 (pic #)',200 (page #)',Text (caption)':PRINT
1040 GOSUB 120:PRINT"Caption text can be up to 255 characters.":GOSUB 140:GOSUB
130
1050 GOSUB 130:PRINT"How do you want the captions printed?":GOSUB 120
1060 PRINT"1) as a list":PRINT"2) as paste-up captions":GOSUB 120:INPUT "Type 1
or 2 ",Q
1070 IF Q=2 THEN 1100
1080 FOR X=1 TO 3:LPRINT:NEXT X
1090 GOTO 1200
1100 FOR X=1 TO 15:LPRINT:NEXT X
1200 READ A$:READ B$:READ C$
1205 NN=NN+1
1210 LPRINT "Illustration #";A$;"          Page #";B$;"          (Caption n
umber: ";NN;")"
1220 LPRINT
1230 LPRINT C$
1240 IF Q=1 THEN GOTO 1080
1250 IF Q=2 THEN GOTO 1100
2000 DATA "1/1",35,"The listing of the program used to produce captions for illu
strations."
2010 DATA "1/2",36,"A sample printout produced by the captions program."

```

Listing 2. The program that helps produce captions for illustrations.

actual illustration, while another is to be included in a list in which all captions appear in consecutive order.

The program in Listing 2 solves these problems beautifully, and I have used it with three nonfiction books so far. You use the data lines (2000 and up) to type in the illustration number, the page number and the caption. If you find that you have to insert one somewhere or delete one, such insertions or deletions can be accomplished with ease. The format for each line is:

DATA "1/1" (ill.#),35 (pg.#),"Caption"

where the page number need not be in quotation marks unless it includes a character other than a digit or a decimal point. It is assigned to a string variable to avoid an error message if the inclusion of a letter or other symbol is required.

When the program is run it asks:

"How do you want the captions printed?"

- 1) as a list
 - 2) as paste-up captions
- Type 1 or 2"

and if you opt for the list, that's what it produces. If you select the paste-up option, it leaves a sufficient amount of space between captions to permit cutting them out and pasting them to the illustrations. In the latter case it is a good idea to use a continuous roll of unperforated paper (assuming your printer includes friction feed) in order to avoid ending up with the perforations in the wrong places. If that is not possible, you may have to adjust the 15 in 1 TO 15 (line 1100) in order to make sure that you always end up with the same number of captions between perforations (three would probably be good).

The third program in this group (Listing 3) is for writing copy used in advertising or brochures. In such applications the writer must frequently deal with subjects that, in large organizations, are usually handled by art departments. I'm once more talking about illustrations. But here the purpose of the program is to determine the dimensions of a given illustration, once it has been reduced or enlarged to fit the available space.

The program requires that you key in the measurements for two sides of the original and for one side of the

```

100 REM SIZE CONVERSIONS FOR ILLUSTRATIONS
110 REM BASIC-80
120 GOTO 200
130 PRINT"-----":RETURN
140 HOME:VTAB(10):RETURN
150 PRINT:INPUT "Press >RETURN ",R$:RETURN
160 GOSUB 140:GOSUB 130:PRINT TAB(30)"End.":GOSUB 130:END
200 GOSUB 140:GOSUB 130:PRINT TAB(10)"This program converts sizes of illustrations.":GOSUB 130
210 GOSUB 150:GOSUB 140:PRINT TAB(10)"You enter measurements for two sides of the original":PRIN
T
220 PRINT TAB(10)"plus one side for the conversion to obtain new dimension.":GOSUB 130
230 PRINT TAB(10)"(For fractions use decimals!)":PRINT:PRINT
240 INPUT "Do you want to see the decimal tables? (Y/N) ",DT$
250 IF DT$="Y" THEN GOSUB 140:GOSUB 1000 ELSE GOSUB 140:GOTO 300
300 INPUT "Original, side 1? ",OS1:PRINT
310 INPUT "Original, side 2? ",OS2:GOSUB 130
320 INPUT "Reproduction, side 1? ",RS1:GOSUB 130
330 CF=RS1/OS1:RS2=OS2*CF:RS2=INT(RS2*10+.5)/10
340 PRINT"The reproduction will be ";RS1;" by ";RS2:GOSUB 130:PRINT:PRINT:CF=CF*100:CF=INT(CF*1
0+.5)/10
350 PRINT"The linear conversion factor is ";CF;"%":PRINT:IF OS1=RS1 THEN FC=CF-(CF/2) ELSE FC=
CF*(CF/2)
360 FC=INT(FC*10+.5)/10
370 PRINT"and the area conversion factor is ";FC;"%":GOSUB 130:PRINT
400 INPUT "Another conversion? (Y/N) ",AC$
410 IF AC$="Y" THEN GOSUB 140:GOTO 300 ELSE 160
1000 S=1/2:T=1/4:U=1/8:V=1/16:W=1/32:X=1/64
1010 PRINT "1/2=";S:GOSUB 130
1020 PRINT "1/4=";T;TAB(20)" 3/4=";TX3:GOSUB 130
1030 PRINT "1/8=";U;TAB(20)" 3/8=";UX3;TAB(40)" 5/8=";UX5:GOSUB 130
1040 PRINT "1/16=";V;TAB(20)" 3/16=";UX3;TAB(40)" 5/16=";UX5;TAB(60)" 7/16=";UX7
1050 PRINT "9/16=";UX9;TAB(20)" 11/16=";UX11;TAB(40)" 13/16=";UX13;TAB(60)" 15/16=";UX15:GOSUB 130
1060 PRINT "1/32=";W;TAB(20)" 3/32=";WX3;TAB(40)" 5/32=";WX5;TAB(60)" 7/32=";WX7
1070 PRINT "9/32=";WX9;TAB(20)" 11/32=";WX11;TAB(40)" 13/32=";WX13;TAB(60)" 15/32=";WX15
1080 PRINT "17/32=";WX17;TAB(20)" 19/32=";WX19;TAB(40)" 21/32=";WX21;TAB(60)" 23/32=";WX23
1090 PRINT "25/32=";WX25;TAB(20)" 27/32=";WX27;TAB(40)" 29/32=";WX29;TAB(60)" 31/32=";WX31:GOSUB 130
1100 PRINT "1/64=";X;TAB(20)" 3/64=";XX3;TAB(40)" 5/64=";XX5;TAB(60)" 7/64=";XX7
1110 PRINT "9/64=";XX9;TAB(20)" 11/64=";XX11;TAB(40)" 13/64=";XX13;TAB(60)" 15/64=";XX15
1120 PRINT "17/64=";XX17;TAB(20)" 19/64=";XX19;TAB(40)" 21/64=";XX21;TAB(60)" 23/64=";XX23
1130 PRINT "25/64=";XX25;TAB(20)" 27/64=";XX27;TAB(40)" 29/64=";XX29;TAB(60)" 31/64=";XX31
1140 PRINT "33/64=";XX33;TAB(20)" 35/64=";XX35;TAB(40)" 37/64=";XX37;TAB(60)" 39/64=";XX39
1150 PRINT "41/64=";XX41;TAB(20)" 43/64=";XX43;TAB(40)" 45/64=";XX45;TAB(60)" 47/64=";XX47
1160 PRINT "49/64=";XX49;TAB(20)" 51/64=";XX51;TAB(40)" 53/64=";XX53;TAB(60)" 55/64=";XX55
1170 PRINT "57/64=";XX57;TAB(20)" 59/64=";XX59;TAB(40)" 61/64=";XX61;TAB(60)" 63/64=";XX63:GOSUB 130
1180 INPUT "Press >RETURN ",RR$:GOSUB 140:GOTO 300

```

Listing 3. The program that determines an illustration's dimensions, once it has been reduced or enlarged to fit a given space.

Listing 4. The program that helps publishers monitor their business.

```

100 REM PROFIT/LOSS BOOKS/PERIODICALS
200 GOSUB 55500:GOSUB 55100
210 PRINT"Publishing data; costs/profit/loss":GOSUB 55100
220 PRINT"You have two choices:":PRINT:PRINT"1) Books":PRINT"2) Periodicals"
230 INPUT "Press 1 or 2 ",BP
240 IF BP=2 THEN 10000
250 GOSUB 55500:GOSUB 55100
260 PRINT"What does it cost to publish a book, and can you make a profit?":GOSUB 55100:GOSUB 554
00:GOSUB 55500
270 INPUT "Do you want the results printed? (Y/N) ",NN$:GOSUB 55400:GOSUB 55500
300 INPUT "Author (advance)? ",A
310 INPUT "Art director? ",B
320 INPUT "Type setting? ",C

```

Listing continued.

reduction or enlargement. It then displays the resulting size of the reduction or enlargement and the linear as well as area percentages. Usually we're stuck with cumbersome measures such as inches and fractions of inches, so the program includes a subroutine (lines 1000 through 1170) to help simplify calculations. If called up in line 240, it displays the decimal equivalents for fractions from 1/2 to 63/64, because the program requires that decimals be used for fractions. It can, of course, be used with metric measures, in which case no conversion would be required and the conversion table in the subroutine can be eliminated.

The last program (Listing 4) is written for writers who would like to be their own publishers. It deals with books as well as periodicals and, in the latter case, can be used for a four-page newsletter as well as for a 200-page magazine full of advertisements.

The program, despite its considerable length, needs little explanation. In lines 270 through 510 you're asked to key in data associated with publishing your book, and in lines 10100 through 10250 the same type of data is required for a periodical. In each case you're asked whether you want the results sent to the line printer; this can be useful if you want to compare results produced by different variables because, in the case of books, the program will print the results for up to four runs if the program is not exited between runs. The section up to line 2030 deals with books, and lines 10000 through 10720 deal with periodicals, while lines 20000 through 25060 access the line printer in order for the results to be printed.

Since many writers tend to toy with the idea of becoming publishers of their own material, running this program can be an enlightening experience.

The four programs in this article are written in the Apple version of Basic-80 (MBasic), using the WordStar word processor. In order to translate them into Applesoft, certain changes will have to be made.

1) Applesoft does not support variable designations that consist of more than two characters. Thus variable names like WTP would have to be

Listing continued.

```

330 INPUT "Corrections etc.?" $*,D
340 INPUT "Printing (body)?" $*,E
350 INPUT "Covers (color)?" $*,F
360 INPUT "Miscellaneous?" $*,G:GOSUB 55500
400 HH=A+B+C+D+E+F+G:GOSUB 55100
410 PRINT"Total cost" $*;HH:GOSUB 55100:GOSUB 55400:GOSUB 55500
450 PRINT"Post publication expenses:" :GOSUB 55100
460 INPUT "Number of books printed?" $*,P
470 INPUT "Advertising costs?" $*,I
480 INPUT "Publicity costs?" $*,J
490 INPUT "Shipping costs?" $*,K
500 INPUT "Storage costs?" $*,L
510 INPUT "Miscellaneous?" $*,M:GOSUB 55100:GOSUB 55400:GOSUB 55500:GOSUB 55100
550 Y=I+J+K+L+M
560 PRINT"Total post publication costs=" $*;Y:GOSUB 55100
565 W=HH+Y
570 PRINT"Grand total=" $*;W:GOSUB 55100:GOSUB 55400:GOSUB 55500
600 V=W/P:V=INT (V*100+.5)/100
610 PRINT"Cost per book=" $*;V:PRINT
620 INPUT "Retail price?" $*,N
630 INPUT "Discount (%)" %*,O:GOSUB 55100
640 Q=N-(N*(O/100)):Q=INT (Q*100+.5)/100
650 PRINT"Net per book=" $*;Q:GOSUB 55100
660 R=Y/Q:R=INT (R)
670 PRINT"Break-even number=" $*;R:GOSUB 55100:GOSUB 55400
700 P$="Number of books printed: " :N$="Retail price: " :O$="Discount (%)" :
710 Q$="Net per book: " :R$="Break-even number: "
720 XX=XX+1:GOSUB 55500:GOSUB 55100
730 PRINT"Current estimate: " :GOSUB 55100
750 IF XX=1 THEN 800
760 IF XX=2 THEN 900
770 IF XX=3 THEN 1000
780 IF XX=4 THEN 1100
790 IF XX=5 THEN 1200
800 PRINT P$;P
810 PRINT N$;N
820 PRINT O$;O
830 PRINT Q$;Q
840 PRINT R$;R
850 P1=P:N1=N:O1=O:Q1=Q:R1=R:GOTO 2000
900 PRINT P$;P;" " ;P1
910 PRINT N$;N;" " ;N1
920 PRINT O$;O;" " ;O1
930 PRINT Q$;Q;" " ;Q1
940 PRINT R$;R;" " ;R1
950 P2=P:N2=N:O2=O:Q2=Q:R2=R:GOTO 2000

```

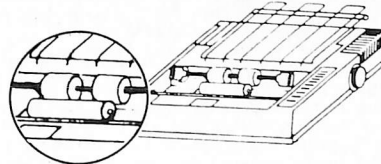
Listing continued.

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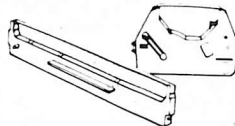


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Listing continued.

```

1000 PRINT P$;P;" ";P1;" ";P2
1010 PRINT N$;N;" ";N1;" ";N2
1020 PRINT O$;O;" ";O1;" ";O2
1030 PRINT Q$;Q;" ";Q1;" ";Q2
1040 PRINT R$;R;" ";R1;" ";R2
1050 P3=P;N3=N;O3=O;Q3=Q;R3=R;GOTO 2000
1100 PRINT P$;P;" ";P1;" ";P2;" ";P3
1110 PRINT N$;N;" ";N1;" ";N2;" ";N3
1120 PRINT O$;O;" ";O1;" ";O2;" ";O3
1130 PRINT Q$;Q;" ";Q1;" ";Q2;" ";Q3
1140 PRINT R$;R;" ";R1;" ";R2;" ";R3
1150 P4=P;N4=N;O4=O;Q4=Q;R4=R;GOTO 2000
1200 PRINT P$;P;" ";P1;" ";P2;" ";P3;" ";P4
1210 PRINT N$;N;" ";N1;" ";N2;" ";N3;" ";N4
1220 PRINT O$;O;" ";O1;" ";O2;" ";O3;" ";O4
1230 PRINT Q$;Q;" ";Q1;" ";Q2;" ";Q3;" ";Q4
1240 PRINT R$;R;" ";R1;" ";R2;" ";R3;" ";R4
2000 GOSUB 55100:GOSUB 55400:GOSUB 55500
2005 IF N4$="Y" THEN 2000
2010 INPUT "Do you want to run another estimate? (Y/N) ";YY$
2020 IF YY$="Y" THEN 220
2030 GOTO 60000
10000 GOSUB 55500:GOSUB 55100
10010 PRINT "What does it cost to publish a periodical,"
10020 PRINT "and can one make a profit?":GOSUB 55100:GOSUB 55400:GOSUB 55500
10030 INPUT "Do you want the results printed? (Y/N) ";MM$:GOSUB 55400:GOSUB 55500
10100 INPUT "Number of copies printed? ";C
10110 INPUT "Number of pages per issue? ";P
10120 INPUT "Number of advertising pages? ";PP
10130 EP=P-PP
10140 PRINT "Number of editorial pages=" ";EP:GOSUB 55100
10150 INPUT "Fee to authors per page? ";F
10160 INPUT "Art cost per page? ";A
10170 INPUT "Typesetting per page? ";T
10180 INPUT "Printing per page? ";PC
10190 EC=F+A+T+PC:GOSUB 55100
10200 PRINT "Cost per editorial page=" ";EC:GOSUB 55100
10210 CE=EC*EP
10220 PRINT "Cost, editorial well=" ";CE:GOSUB 55100
10230 INPUT "Revenue per ad page? ";AR
10240 INPUT "Layout cost per ad page? ";L
10250 INPUT "Printing cost per ad page? ";PA:GOSUB 55100
10260 RA=AR-L-PA
10270 PRINT "Net revenue per ad page=" ";RA:GOSUB 55100
10280 AR=RAX*PP
10290 PRINT "Total net ad revenue=" ";AR:GOSUB 55100:GOSUB 55400:GOSUB 55500
10300 GP=AR-CE:GOSUB 55100
10310 PRINT "Gross profit/loss per issue=" ";GP:GOSUB 55100:GOSUB 55400:GOSUB 55500
10400 INPUT "Number of issues per year? ";IY
10410 INPUT "Office overhead per month? ";O
10420 OI=(O*12)/IY:OI=INT (OI*100+.5)/100:GOSUB 55100
10430 PRINT "Overhead per issue=" ";OI:GOSUB 55100:GOSUB 55400:GOSUB 55500
10440 INPUT "Paper cost per year? ";PY
10450 PY=PY/IY:GOSUB 55100
10460 PRINT "Paper cost per issue=" ";PY:GOSUB 55100
10470 INPUT "Miscellaneous per month? ";M
10480 M=(M*12)/IY:M=INT (M*100+.5)/100:GOSUB 55100
10490 PRINT "Miscellaneous per issue=" ";M:GOSUB 55100:GOSUB 55400:GOSUB 55500
10500 GC=GP-OI-PY-M:GC=INT (GC*100+.5)/100
10510 PRINT "Profit/loss per issue before distribution=" ";GC:GOSUB 55100:GOSUB 55400:GOSUB 55500
10520 INPUT "Number of subscriptions? ";S
10530 INPUT "Number of newsstand sales? ";NS
10540 LO=C-S-NS:PRINT
10550 PRINT "Number of leftovers=" ";LO:GOSUB 55100:GOSUB 55400:GOSUB 55500
10560 PRINT "Revenue after deducting cost of distribution="":GOSUB 55100
10570 INPUT "Revenue per each single subscription issue? ";RS
10575 INPUT "Distribution cost per single issue? ";DC:RS=RS-DC
10580 INPUT "Revenue per each single newsstand issue? ";RN
10585 INPUT "Distribution cost for ALL newsstand issues? ";DN:RN=RN-(DN/NS)
10590 INPUT "Cost per each single leftover issue? ";LC:GOSUB 55100
10600 SR=RSXS:NR=RNXNS:OL=LOXLC
10610 PRINT "Subscription revenue=" ";SR
10620 PRINT "Newsstand revenue=" ";NR
10630 PRINT "Loss from leftovers=" ";OL:GOSUB 55100
10640 TR=SR+NR-OL:TR=INT (TR*100+.5)/100:TR=TR+GC
10650 PRINT "Grand total, profit/loss, per year=" ";TR:GOSUB 55100:GOSUB 55400:GOSUB 55500
10660 IF MM$="Y" THEN 25000
10700 INPUT "Do you want to run another evaluation? (Y/N) ";YY$
10710 IF YY$="Y" THEN 220
10720 GOTO 60000
20000 LPRINT P$;P;" ";P1;" ";P2;" ";P3;" ";P4
20010 LPRINT N$;N;" ";N1;" ";N2;" ";N3;" ";N4
20020 LPRINT O$;O;" ";O1;" ";O2;" ";O3;" ";O4
20030 LPRINT Q$;Q;" ";Q1;" ";Q2;" ";Q3;" ";Q4
20040 LPRINT R$;R;" ";R1;" ";R2;" ";R3;" ";R4
20050 GOTO 2010
25000 LPRINT "Number of copies=" ";C
25010 LPRINT "Net ad revenue per issue=" ";AR
25020 LPRINT "Profit/loss per issue before distribution=" ";GC
25030 LPRINT "Subscription revenue=" ";SR
25040 LPRINT "Newsstand revenue=" ";NR
25050 LPRINT "Grand total, profit/loss, per year=" ";TR
25060 GOTO 10700
55100 PRINT "-----"
55110 RETURN
55400 PRINT:INPUT "Press (RETURN) ";Y$
55410 RETURN
55500 HOME:FOR X=1 TO 10:PRINT:NEXT X
55510 RETURN
60000 GOSUB 55100:PRINT "End.":GOSUB 55100:END

```

changed to something like WT or W1. This is applicable to all four programs.

In the program that converts typed pages to printed pages, no other changes need to be made.

In the Captions program, the command LPRINT in lines 1080, 1100, 1210, 1220 and 1230 is not supported by Applesoft. These lines must be changed as follows:

```

1080 FOR X=1 TO 3:PR#1:PRINT:PR#0:
NEXT X
1100 FOR X=1 TO 15:PR#1:PRINT:PR#0:
NEXT X
1210 PR#1:PRINT " (and the existing copy)"
1220 PRINT
1230 PRINT C$:PR#0

```

In the Size Conversion program, the ELSE statement in lines 250, 350 and 410 is not supported by Applesoft. The lines must be changed as follows:

```

250 IF DT$="Y" THEN 270
260 GOSUB 140:GOTO 300
270 GOSUB 140:GOSUB 1000:GOTO 300

```

and the second half of line 350, change to:

```

IF OS1>RS1 THEN 352
351 FC=CF+(CF/2):GOTO 360
352 FC=CF-(CF/2)

```

and:

```

410 IF AC$="Y" THEN 430
420 GOTO 160
430 GOSUB 140:GOTO 300

```

In the Self-Publishing program the only changes affect the LPRINT statement in lines 20000 through 25050:

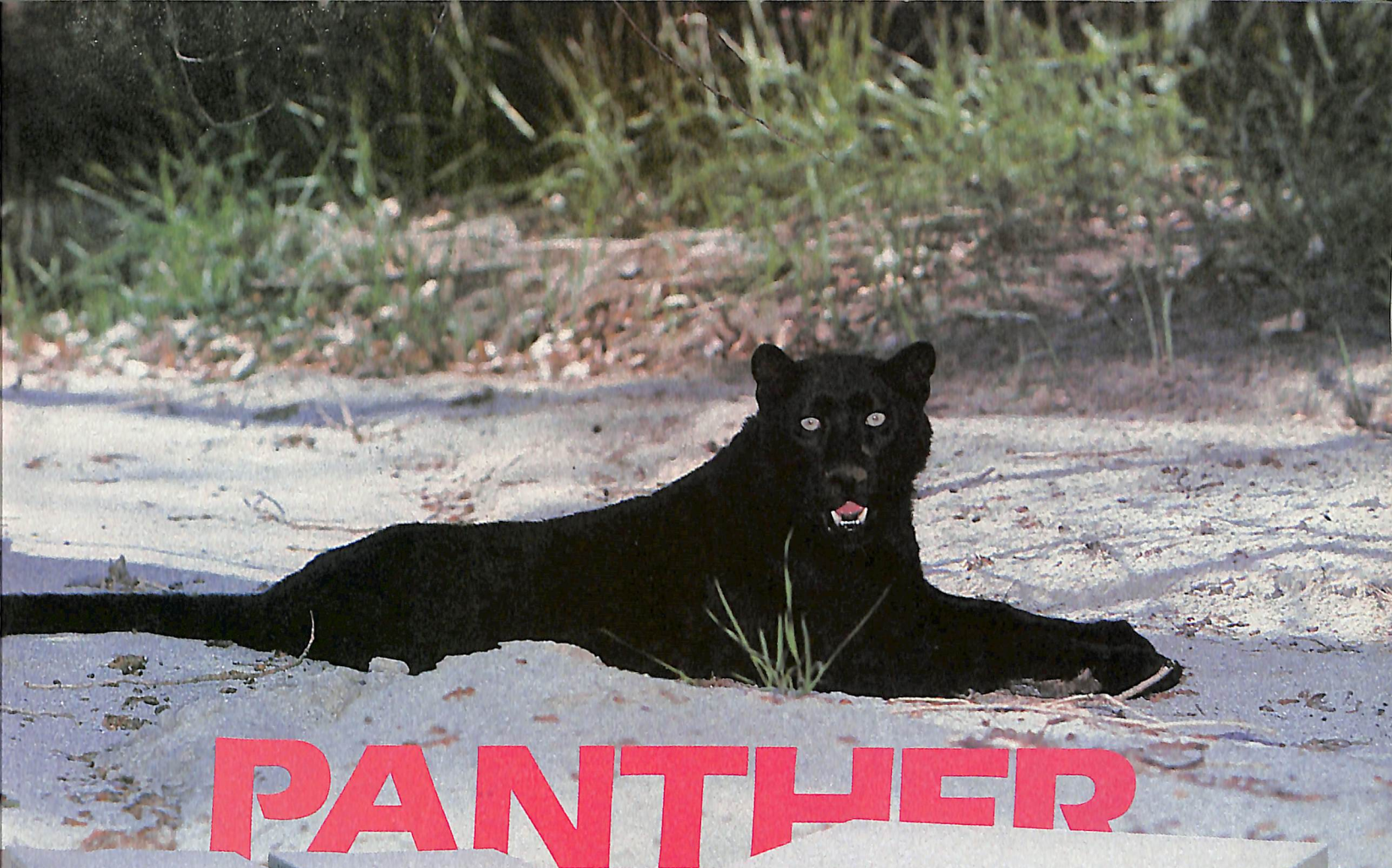
```

20000 PR#1:PRINT (and the rest of the line)
20010, 20020, 20030, 20040 PRINT (and the rest of the line)
20050 PR#0:GOTO 2010
25000 PR#1:PRINT (and the rest of the line)
25010, 25020, 25030, 25040, 25050 PRINT (and the rest of the line)
25060 PR#0:GOTO 10700

```

With these changes made, all four programs should function perfectly well in Applesoft.

If you are operating with an Apple II Plus or an Apple IIe without the 80-column card, you may want to break up the lines of copy that are to be displayed in order to produce a clean looking display. Furthermore, there is no significance to the use of lowercase letters. Uppercase will do just as well. ■



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the Photographer's Apple

This entrepreneur exposes how he used his Apple to develop a thriving photography business. Now his family is all smiles!

by Mike Brewer

Photographers are inveterate “gear heads.” They can spend untold hours tinkering with their gadgets and a month of Sundays talking about them. So, it was inevitable that our combination photo studio and custom laboratory would, at some point in time, invest in the ultimate gadget—a microcomputer!

This process came to pass about two years ago, when our bookkeeper resigned to become a full-time mommy. At the time, like most cottage industries, we had the standard assortment of office equipment: five filing cabinets, a typewriter, a “One Write” accounting system, and four card files of photographic clients. We also had a serious decision to make—whether to hire another bookkeeper or purchase a computer system.

Since we were feeling the effects of the recession, we chose to computerize our bookkeeping, rather than go to the considerable expense of hiring and training replacement personnel.

Write to the author, Mike Brewer, at PO Box 329, Westerville, OH 43081.

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Due to the burgeoning number of retailers and an enormous library of software, we chose to purchase an Apple II Plus 48K system, complete with two Disk II drives, an Epson MX-100 dot matrix printer with a "boat anchor" interface, an NEC green monitor and a System Saver cooling fan with surge suppressor. Since then, we have upgraded to the faster NEC PC-8023 printer, and purchased a Microtek 16K language card, Honda clock, 80-column and Z80 CP/M cards, a graphics printer interface and, later, a similarly configured Apple IIe 128K system with a Microtek Magnum 80e extended 80-column text card.

Startup

We selected Apple's "Controller" accounting package, by Dakin Five, consisting of general ledger, accounts receivable and accounts payable. All of the modules worked flawlessly and were incredibly easy to understand and use. The package provided printed monthly customer statements and aged trial balances, wrote checks and produced profit and loss reports on demand, all of which enhanced our professional appearance and kept our accountant grinning. (Yes, we still have our accountant double-check us from time to time. In fact, we made an Apple junkie out of him, too!)

We brought up the accounting system over a period of about three months and required professional accounting assistance only when we were assigning numbers to accounting classifications. We probably could have done so ourselves, but felt much more comfortable being supervised, particularly since none of us had any accounting or bookkeeping experience.

Like everything in computerdom, the Controller's usefulness soon was eclipsed by many faster, more powerful, less expensive systems which included additional integrated modules, such as point of sales invoicing, payroll, purchase orders, job costing, inventory control and on and on. So, we decided to purchase Accounting Plus IIe, primarily for its invoicing capabilities.

To our amazement, we discovered

that this system, written in speedy Pascal, was much more than we had bargained for. It automatically and simultaneously updates general ledger and accounts receivable or accounts payable while sales invoices or vendor payments are being processed, and can generate on-the-spot profit and loss reports within minutes of the last invoice or payment. (The Accounting Plus folks claim the same capability with their upcoming payroll and inventory control modules.)

This system is considerably faster than our previous accounting package and, because of its data compacting feature, holds more than twice the

**"The 'mainframers' could
learn a thing or two here."**

data. The transition to the package wasn't particularly difficult. We simply waited until the end of our accounting year and transferred year-end figures and accounting classification numbers from one package to another. We attribute this to the almost universal acceptance of standard accounting principles among microcomputer software scribes. (The "mainframers" could learn a thing or two here.)

As an unexpected bonus, the entire accounting package can be uploaded to a hard disk at any time without having to purchase any additional software.

Word Processing

Strangely enough, the accounting function does not absorb the greatest share of our computer time. We discovered many more business uses for our computers than we ever could have imagined.

We received AppleWriter II with our original system purchase and have since learned that this Pascal word processor has more bang for the buck than any other word processor in existence. With its easy-to-use Word Processing Language (WPL) programs included on the program disk, we regularly produce hundreds of personal-

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ized form letters, price lists, postcards and labels for mass mailings to current and prospective clients. Of course, "Sensible Speller" from Sensible Software checks our words of wisdom against its 80,000-word dictionary, shows us what poor spellers we are, suggests suitable alternatives and makes the replacements in only a couple of minutes. This beats proof-reading by a mile.

Our satisfaction with this duo was painfully reinforced after purchasing a Z80 card and borrowing from a friend the best-selling CP/M word processor. We found this word processor, with its random assignment of control codes,

**"We religiously make
 telephone calls with PFS File
 and consider it as powerful a
 sales tool as the Yellow Pages."**

about as user-friendly as a scorpion and considerably less powerful, even with its ability to scroll sideways. And, the companion spelling checker is comparatively miniscule. Now, my gracious friend isn't so happy, either. If we could only find some good Z80 games, maybe...

As an aside, our teenage daughters earn spending money entering bride addresses into AppleWriter text files, and our 13-, 15- and 16-year-old sons have gotten in on the act, too. Being accomplished graphics experts, they regularly earn hefty sums preparing slide presentations for bridal shows and other sales promotions, using Beagle Brothers' "Frame Up." This is both a real attention getter and a fun way of making the youngsters feel like important members of the "corporate team."

Spreadsheets

Pricing of goods and services never has been easier or more accurate and timely, thanks to "VisiCalc" from VisiCorp.

We calculate all of our prices, using data that can be directly transferred from Accounting Plus IIe. After masaging the data ("what-iffing," if you

will), we save resulting price schedules to disk and load them into AppleWriter for final editing and, eventually, offset printing. We also allow our wedding clients to customize their photographic coverage by entering data on a VisiCalc model which automatically calculates the charges for all our services and prepares a detailed invoice. This feature helps our clients understand the expenses involved in the creation of their wedding album, eliminates the need for offering "lock-step"-type wedding packaging and has improved sales by offering virtually unlimited variety.

Managing Records

We maintain two different kinds of client files—short ones and long ones. We employ Apple's "Quick File" database manager for laboratory work order tracking and other records that don't require much space, such as prospect mailing lists. This program is written in pure Pascal, resides entirely in RAM and sorts hundreds of records in seconds. It searches just as quickly using full or partial words or numbers, generates calculated reports and talks directly to AppleWriter IIe. The documentation alone is worth the \$100 cost of the program.

For such things as wedding data for bridal clients, which can get lengthy at times, we use "PFS File" from Software Publishing. With PFS, we can maintain records with up to 30 screens of data per client, and retrieve these records in less time than it used to take to open a file drawer. We religiously make telephone sales calls with PFS File and consider it as powerful a sales tool as the Yellow Pages.

Other Things

We maintain and reconcile our many checking accounts with Continental's "Home Accountant," which allows budget planning and analyses, complete with graphs. We also keep track of appointments and long range planning and promotions on "Agenda Files," one of Apple's "Special Delivery" programs; however, we are thinking of purchasing "Visidex" from VisiCorp for the same purpose. Visidex searches for dates or items at lightning

speed, using single or compound words and interfaces with our Honda clock, which automatically enters times and dates each time we boot our scheduling or accounting packages.

Nor have we passed up opportunities to use programs for unintended purposes. My wife's recipe program, for instance, is handy for storing detailed check lists of paraphernalia for use in "location" photography and vacation trips. Moreover, AppleWriter II and IIe, in conjunction with our dot matrix printer's CG graphics, are useful for preparing customized forms "masters" for offset printing. In fact, we seldom buy general purpose or custom designed forms anymore.

Easy to Use

Of course, no discussion of micro-computers in small business would be complete without some additional mention of user friendliness, which is what micros are all about.

None of us are programmers, nor do we harbor any latent desires to become such. Nonetheless, we learned to run all of our programs by using the instructions provided and asking questions of software vendor technical staffs, whose support we found as fine as their software.

For example, just weeks ago, we received an announcement from Apple Computer that Dakin Five was no longer supporting the Apple Controller package. Included with the announcement was a certificate for the purchase of the BPI Accounting System for little more than the cost of reproducing the disks and printing the instruction manuals. This is a remarkable demonstration of customer support.

Looking Ahead

We are now searching for a method to store data directly from our color printing analyzers to our Apples to help reduce the testing required for re-printing our client photographs. Theoretically, we should be able to put final color filtration and exposure test data on a micro, change the data as changes in printing materials take place, and reprint client orders at any point in the future with little or no retesting. (Any help you can provide would be deeply

appreciated.) Our studio also is converting area Chamber of Commerce mailing lists to disk for use in soliciting potential commercial photography clients. Our laboratory, meanwhile, is testing the feasibility of providing specialized accounting, job costing and billing services to our lab clients.

Because of the micro, our electronic

cottage industry is now managing and tracking projects that we only dreamed about a few years ago. We even have found the time to start up and manage a burgeoning micro consulting and software/peripherals supply company. For us, the future looks very promising.

In fact, my Apples are beginning to make work fun again! ■

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Rana		Micro Sci		Orange Micro		Quadram Microfazer	
Elite 1 163kb	\$279.95	A2 143kb	\$249.95	Grappler +	\$135.95	8k	\$139.95
Elite 2 326kb	429.95	A40 164kb	289.95	w/16k	179.95	16k	159.95
Elite 3 652kb	539.95	A70 286kb	349.95	w/32k	194.95	32k	179.95
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Be a Computer Consultant

This expert explains how she leads the uninitiated through the microcomputer menagerie.

by Trish McClelland

If you own an Apple, you own a gold mine.

When Steve Jobs and Steve Wozniak were hard at work designing the Apple computer, they could not have known the far-reaching implications that single board circuitry would have on the world. They opened the door to the age of micro technology. The gadgets used in James Bond movies and in science fiction suddenly became realities through the use of microchips and desktop computers.

Prior to the birth of the microcomputer, computers were too expensive for small offices. Too often they required programmers, systems analysts and full-time operators. But with the invention of the Apple, computerization has become possible for almost everyone.

The cost of the hardware itself is minimal; a complete system averages around \$3,000. With the vast amount of packaged software products on the market, there is no need to employ computer professionals. And a microcomputer can be placed on any desk or in any room that contains a standard wall outlet. It even is portable—or transportable, as some circles prefer to call it.

But with every rose there is a thorn.

Of the Essence...

Think for a moment about your doctor's office. Most doctors work in

an office with fewer than ten people on their staff. Which one of those people has the knowledge, experience, and the *time* to design a system that will automate their office?

The answer is no one. These people are medical professionals—doctors, nurses, medical assistants. Although they could be computer hobbyists, it is unlikely that they have the skills necessary to automate an entire office.

They need a computer specialist to evaluate their needs, design a cus-

tomized system and train their staff how to operate the computer. The result: a new breed of people—specializing in microcomputer consulting services.

You may be surprised to learn that you don't need many materials or much working capital to start a computer consulting firm. To begin, all you really need is an Apple and a client. The money you earn from your first client will more than pay for the office supplies you will need later.

There are two ways to automate a business: writing your own program, or using a packaged software product. I know several people who earn their living by writing their own programs specifically to fit their clients' needs. The programs cost from \$15,000 to \$60,000, and normally require ten to twelve months to create. I, however, chose to use packaged software products, with more timely, cost effective results.

Anyone can learn to write databases using a packaged software product. You don't need to be a programmer or systems analyst. A DBMS package serves as the skeleton, providing the prompts that lead you to create the database.

The process requires from one to eight weeks to perform. Even this short time frame allows for the necessary debugging and testing of the system. The average hourly rate for this kind of service is between \$40 and



Trish McClelland operates her own microcomputer consulting firm, and is the author of *Creating the Perfect Database*, to be published in 1984 by Scott, Foresman & Co. Write to her at 205 Yoakum Parkway #702, Alexandria, VA 22304.

\$75 an hour, which means the average database will gross approximately \$750 to \$1000. Training the employees would double that amount.

Why Pay More?

Owners of small businesses are very cost conscious; they have to be in order to stay in business.

Recently I made an appointment with a doctor to discuss automation of his facilities. As I was waiting for him to finish with his patients, a gentleman walked in and asked to see him. The receptionist explained that he needed an appointment, and made one for him for the following week. The person then left a large stack of literature for the doctor to read regarding the computerization of his office.

When I spoke with the doctor a few minutes later, I jokingly referred to the other consultant and remarked that I hadn't gotten to the doctor too early. He then glanced at the literature the other person left for him and remarked that he had seen that firm's systems before. He would not use them, however, to automate his office because the price tag for their services was \$60,000!

I showed this doctor how he could automate his office with a \$3,000 microcomputer, approximately \$500 in software, and a consultant (me) that would cost him approximately \$2,000—saving himself \$54,500.

The actual designing, creating and testing of the system can be done in the privacy of one's own home. You can allow clients to participate in the process by permitting them to approve each step as it is completed. Or you can arrange to simply deliver a finished product to them.

I have established three contracts, which I call "plans." The first plan states the client will provide the consultant with the information required to create a database. Upon completion, the consultant supplies the database to the client. The client then agrees to provide the necessary training to the employees. This plan is ideal if the client or the employees already have used an Apple or the software package involved.

In Plan II, clients take part in the



Trish McClelland (left) discusses software requirements with clients Debby and Rocky Robinson of Rocky Robinson Used Cars.

"I showed this doctor how he could automate his office with a \$3,000 microcomputer, approximately \$500 in software, and a consultant (me) that would cost him approximately \$2,000—saving himself \$54,000."

entire process. They approve the design of the input screens, actually use the screens for a period of a week or more, and approve the report formats. They are kept abreast of every step, and their employees receive thorough training. This option is preferred by clients who have never before used computers.

The third plan combines features from the first two. The consultant creates the entire database and then presents it to the client. The employees receive thorough training at that time. This plan is preferred by clients who want the benefit of training, but who lack either the time or the inclination to oversee each step of the process.

In addition, I have a special contract similar to Plan III for those clients who require accounting systems.

I create it independently, deliver it to the client and provide users the proper training.

Dialing for Dollars

A consultant always must provide continued technical assistance. If you have a full-time job and don't wish consulting work to interfere with it, buy a telephone answering machine with remote control, and call for your messages during your breaks or lunch. That way you won't miss any of your calls—more important, your client always will get an answer. You'll find that new users will have many questions, most of which can be resolved over the phone.

I have made a policy never to charge for telephone assistance. I can phone the makers of the software products without being charged, so I offer the same service to my customers.

I also provide a manual with each system, explaining the steps and procedures in simple, easy-to-read terms. I modify the first manual I designed for subsequent databases, and provide it to the client at no charge.

Although I purchased business cards, I never advertise my services. Remember the shampoo commercial that goes, "...you'll tell two friends, they'll tell two friends, they'll tell two friends..." and before long, you have 50 faces on your TV screen? The same thing happens in consulting; word of mouth can bring in more business than you may want to handle.

If you do advertise, don't place ads in a newspaper. Place them instead in trade journals. A medical journal, for instance, could contain an ad specifically designed to appeal to doctors. A friend of mine tried this approach and received inquiries from all over the country. Most businesses also are willing to pay travel expenses in addition to an hourly rate.

And do charge an hourly rate. Don't cut your throat by charging a flat fee. Some clients need very little assistance, but others may require modifications a year after the database was completed.

"Not only do your clients refer you to others, but they frequently decide they want more applications than they originally intended."

Hidden Benefits

One of the nicest things about consulting is that it generates repeat business. Not only do your clients refer you to others, but they frequently decide they want more applications than they originally intended. An example is the client who wants to automate his/her customer data, and decides that payroll and personnel data should be automated, also.

You can go one step further and provide data entry support as well. An office that has operated on a manual system frequently has a great deal of initial data to be input. Although a secretary or other employee can maintain the database, sometimes s/he doesn't have the time to enter the bulk of information.

By providing a data entry clerk to perform this duty, you lighten the client's load. The person you provide

can be a retired person, a housewife, or a student who would like temporary work.

Be careful, though, when you begin to employ people. The various states have different laws. You can treat the person as an employee, which results in withholding taxes, minimum wage requirements, and so on. Or you can have a subcontractor relationship.

You may want to purchase invoices and mail them monthly to your customers. I purchased continuous feed invoices from a stationery house. The "shell" of the invoices—their design without information—was set up on VisiCalc. Each month

I simply fill in the information and print them.

The cost of the equipment and any office supplies are tax deductible. A portion of your phone bill, car mileage, and even space used in your home for operating your business, are also tax deductible.

The Small Business Administration can supply names of offices, both in the private and government sectors, that can assist you in your consulting business. In many cities classes and seminars are offered free, a list of which is available from the SBA.

If you have an Apple, it should be earning money for you. The micro-computer consulting area is new and exciting. It's virtually nonexistent in many areas, so the field is wide open. You'll earn a lot of money, meet a lot of people, and most of all, you'll be having fun! ■

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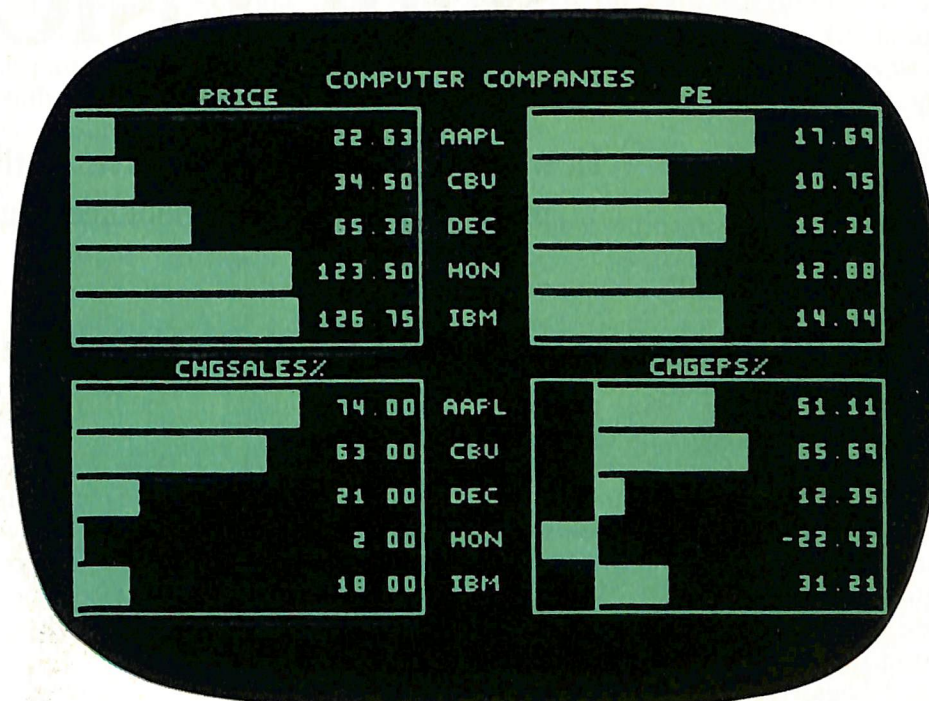
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Preschool Financial Management with VisiCalc

How an Apple and VisiCalc excused these preschool proprietors from their bookkeeping homework.

by J. Patrick Dougherty

In the summer of 1982, my wife became the director of the Rockbrook Children's Center, an established Omaha preschool. Since I am an engineer and am comfortable with figures, my wife gave me the task of managing the school's finances. While my wife promptly began coming up to speed on such items as lesson plans, I began learning the intricacies of bookkeeping for a small business.

The basic financial tasks required in managing the preschool are the same as in any small business: recording income and paying salaries and expenses. In our case, we have approximately 40 students who attend from two to five days per week. Each student pays tuition monthly; teachers are paid at the end of the month.

Expenses consist of food, rent and school supplies.

Keeping track of these items isn't difficult, but it is time-consuming. Since I work full-time as a practicing engineer, I haven't the time the previous director did to devote to bookkeeping (which she did manually).

Budgeting

One of the first problems I faced as bookkeeper was to project the school's monthly gross revenue. This problem was twofold, since (1) students attend different numbers of days per week and pay different amounts of tuition, and (2) we needed to set tuition rates to ensure adequate income. By using VisiCalc's built-in LOOKUP function, I could build a four-entry table for tui-

tion rates based on number of days attended. Each student's tuition then was indexed to this table, based on the number of days attended, from two to five. I then projected our revenue using the actual student data, and checked it against projected expenses to see if the rates were adequate. Use of VisiCalc made this a very quick process compared to manual methods, once the student data was entered.

Once the budgets were set, each month's income had to be calculated by adding each payment to the total as

Address correspondence to J. Patrick Dougherty, c/o Rockbrook Children's Center, 11026 Prairie Hills Dr., Omaha, NE 68144.



it came in. About this time I decided to make each VisiCalc worksheet represent one month's transactions. I created a column for each deposit date and entered each payment by the student's name as it came in. To get totals for the month I created two sets of sums. Each student's account was summed horizontally to record all payments made in a month, and each student's total was added vertically to get our total income for the month.

The first sum serves an additional purpose—checking off who has paid. By scanning the column, I can detect unpaid bills by those with zeros in the column. This in itself is a real time-saver.

Expenses

Recording expenses is simple with VisiCalc and its free format text fields. I have constructed the worksheet so that a text field precedes each entry. This allows me the flexibility to handle unusual occurrences just by entering the appropriate description and the amount, and summing it to get the total. The size of a VisiCalc sheet and the speed of a computer allow me to carry along expense details along with

the total, which probably couldn't be done using a manual system.

Payroll

The daily payments we make to our two teachers require two entries—their pay per day and how many days each works in a month. A teacher's gross pay is the product of the two.

Rather than automating the decidedly non-linear federal withholding tax calculation, I just look it up in a table. This is feasible because the entire center employs only three people. The state of Nebraska withholds a straight percentage of the federal tax, so that calculation is taken directly from the federal. As we have seen on our paychecks for many years, net pay is simply the gross minus deductions, and this is handled as such on the monthly spreadsheet. Now comes the good part. My wife's salary as director of the preschool also is an expense. By summing the expenses and subtracting them from the income, we know what she can be paid—all in one VisiCalc sheet!

Other Uses for the Apple

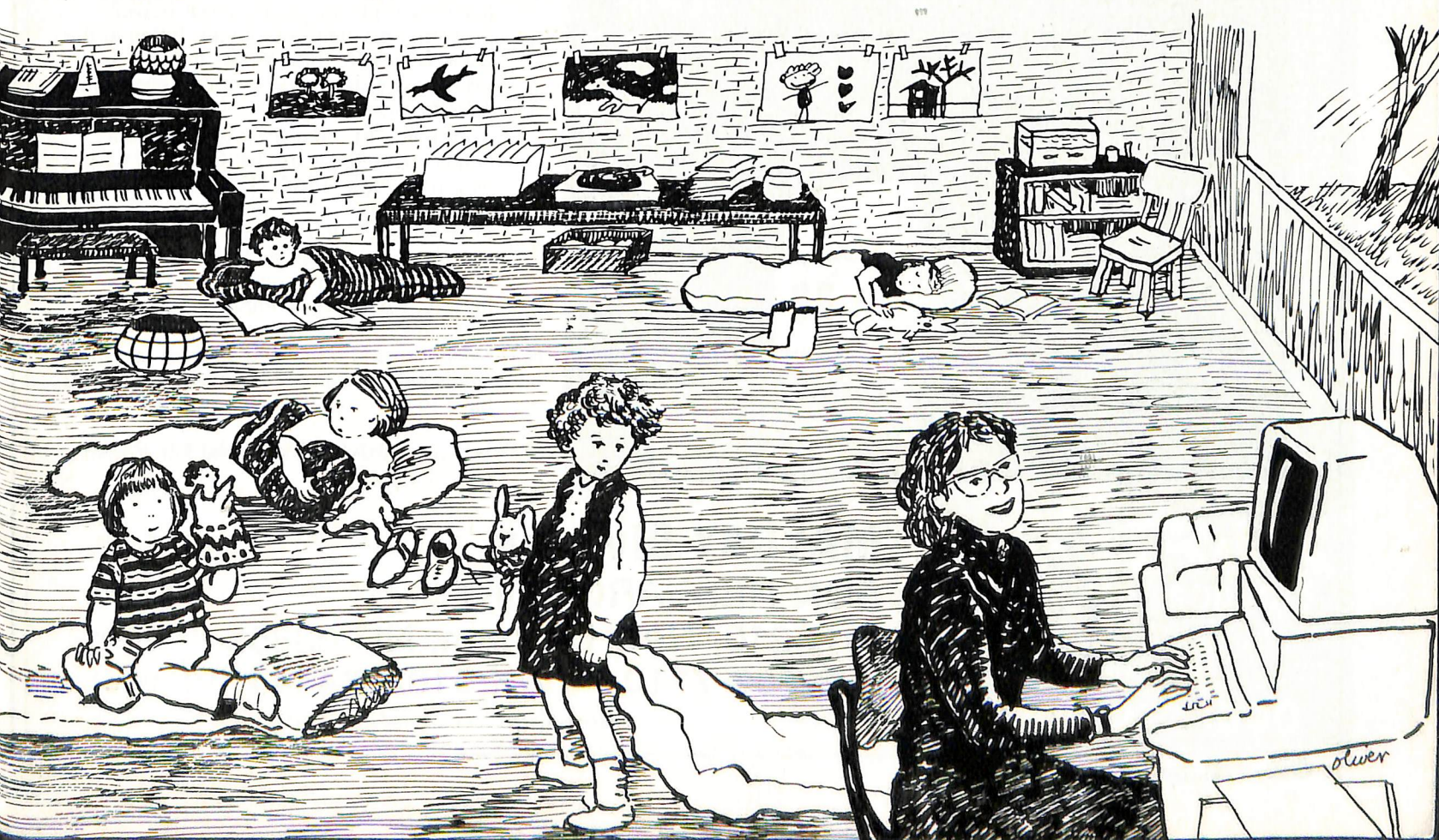
The VisiCalc worksheet was the first

step in automating the preschool. The next step was to create a small-scale database manager to keep track of the children's records. Rather than using an existing program, I wrote a simple DBMS in Basic because (1) the cost of a separate program was prohibitive, and (2) I wanted to interface the student records to the VisiCalc spreadsheet, which would have increased costs even more.

Our program, operational for the 1983-84 school year, allows us the luxury of entering a student's data only once. The DBMS automatically generates the lists needed to run the school, such as daily attendance, master attendance and birthday lists. It's hard to evaluate time saved on the DBMS so far since development took a few hours, but overall I think it will be worth it.

Summary

The Apple has helped us tremendously in managing the preschool. Financial record keeping is less time-consuming, more accurate and complete, and our homegrown DBMS has eliminated the need to re-type student information already entered into the file.



Administrator's Notes

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This includes entering names into the VisiCalc spreadsheet, since that interface has been automated.

The Apple's word processing power also has proven useful. We haven't automated the quarterly tax payments, but that isn't done nearly as

often as recording payments and doesn't take that long when all the data is on the Apple. Still, buying the Apple was a wise decision for all of the reasons I've given. See samples of the spreadsheet and the DBMS in Figures 1 and 2. ■

ROCKBROOK CHILDREN'S CENTER INCOME AND EXPENSES - SEPT, 1983

BASIC RATES	# OF STUDENTS	# OF DAYS IN MONTH
TWO DAYS 27.00	36	18.00
THREE DAY 37.00		
FOUR DAYS 47.00		
FIVE DAYS 57.00		

INCOME, PROJECTED AND ACTUAL

SEPTEMBER PAYMENTS

STUDENT LIST	# OF DAYS	BASIC COST, \$	9/8	9/15	TOTAL	OWED
ANDRES, WILLIAM	3	37.00	37.00		37.00	0.00
ANTHOFFER, KATHLEEN	2	27.00	27.00		27.00	0.00
BARRAZA, MARIBEL	2	27.00	27.00		27.00	0.00
BILLESBACH, KELLY	3	37.00	37.00		37.00	0.00
BRENNAN, JIMMY	3	37.00		37.00	37.00	0.00
BRO, KIMBERLY	2	27.00			0.00	-27.00
BRO, CORTNEY	2	27.00			0.00	-27.00
BUJARSKI, KIM	2	27.00	27.00		27.00	0.00
COLLINS, MOLLY	3	37.00	37.00		37.00	0.00
FINK, DEREK	3	37.00		37.00	37.00	0.00
GILMORE, STEPHANIE	2	27.00	27.00		27.00	0.00
HANSEN, KYLE	3	37.00		37.00	37.00	0.00
JOHNS, MATTHEW	2	27.00	27.00		27.00	0.00
KNOWLES, EMILY	3	37.00	37.00		37.00	0.00
KRINGS, MATTHEW	2	27.00		27.00	27.00	0.00
LANKFORD, AMANDA	3	37.00	37.00		37.00	0.00

Figure 1. A sample VisiCalc spreadsheet.

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2. EDIT STUDENT DATA
3. DELETE STUDENT FROM LIST
4. ATTENDANCE LIST BY DAY OF THE WEEK
5. STUDENT BIRTHDAY LIST
6. MASTER ATTENDANCE LIST
7. PREPARE VISICALC FILE
8. MASTER STUDENT LIST
9. STUDENT ADDRESS LIST
0. END PROGRAM

ENTER YOUR CHOICE : 1

ENTER NEW STUDENTS

WANT INSTRUCTIONS ? (Y/N) Y

**** INSTRUCTIONS-STUDENT DATA ENTRY**

THE PROGRAM FIRST ASKS IF A PREVIOUS FILE EXISTS. IF A FILE DOES EXIST, YOU WILL BE ASKED FOR ITS NAME. ENTER IT, FOLLOWED BY A CARRIAGE RETURN. (RETURN KEY)
THE PROGRAM WILL PROMPT YOU FOR DATA, ONE ITEM AT A TIME. ENTER THE DATA IN THE ORDER REQUESTED, IN THE FORM IT IS TO APPEAR ON THE VARIOUS LISTS. EIGHT DATA ITEMS ARE GIVEN. IF A DATA ITEM IS NOT AVAILABLE, PRESS RETURN WHEN ASKED. PRESS RETURN WHEN YOU ARE FINISHED WITH AN ENTRY. WHEN FINISHED, THE PROGRAM WILL GIVE YOU A SECOND CHANCE TO RE-ENTER DATA AS NECESSARY BEFORE PROCEEDING TO THE NEXT STUDENT. WHEN DONE, THE PROGRAM WILL ASK YOU FOR THE NAME OF A FILE TO SAVE THE DATA ON. ENTER A NAME YOU WILL REMEMBER. IF YOU WISH, YOU MAY ENTER THE NAME OF A FILE WHICH ALREADY EXISTS. IF YOU DO, THE OLD FILE WILL BE REMOVED.

**** END OF INSTRUCTIONS ****

DOES A PREVIOUS STUDENT FILE EXIST ? (Y/N)

Figure 2. Sample DBMS screen.

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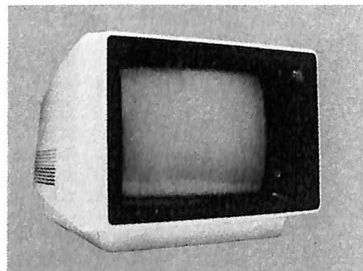
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- HAYES CHRONOGRAPH \$199
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- U.D.S. Series Modems CALL

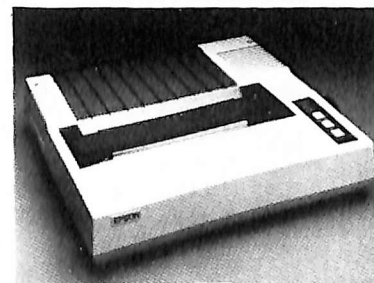
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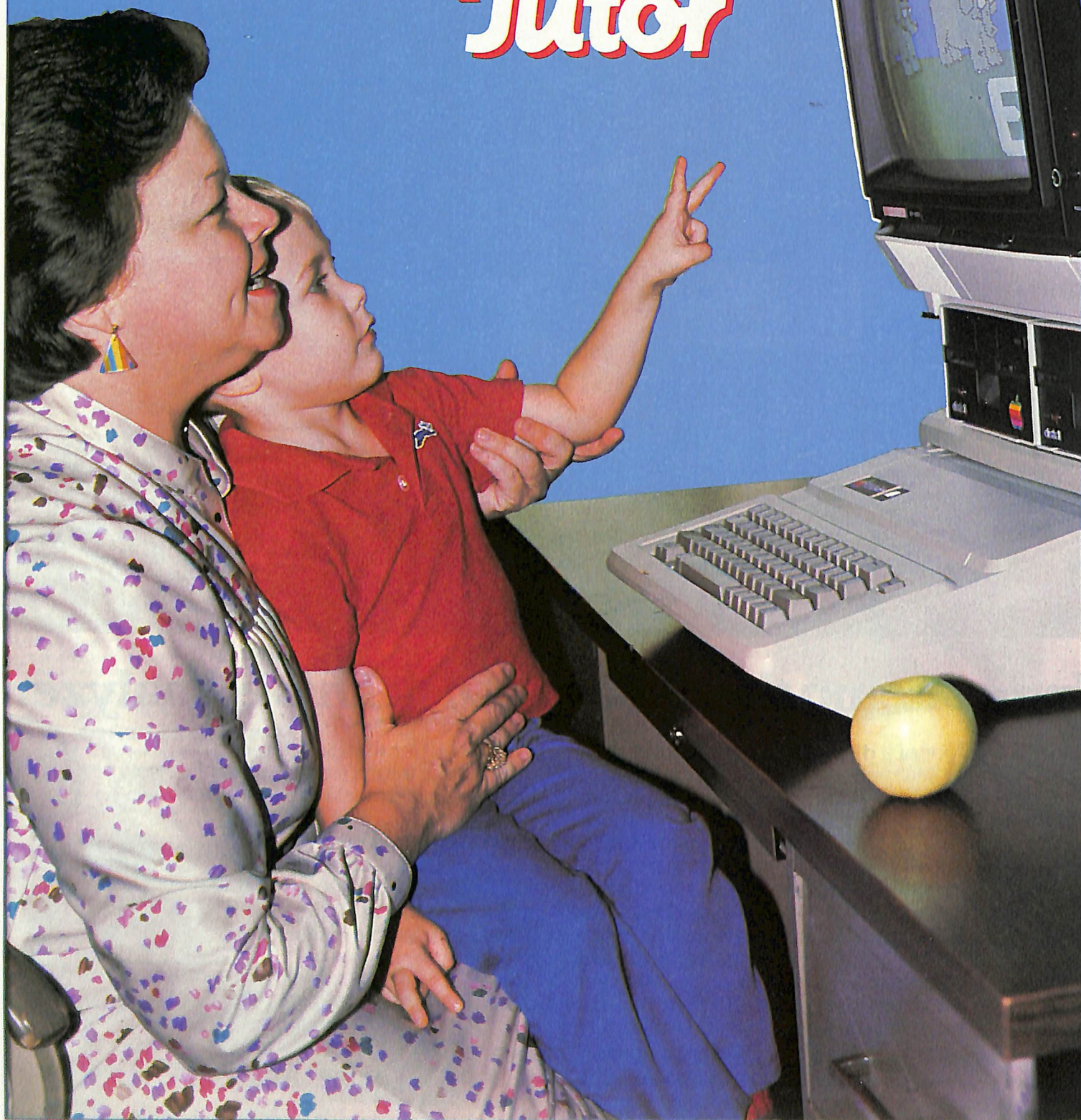
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The Computer Tutor



**This lifelong educator
overcame many obstacles
to establish her successful
Apple cottage industry.
Perhaps you'll tell a
similar story someday.**

I have three passions: teaching, computers and children. After the acquisition of our family Apple, it was inevitable that these interests would merge. Today my husband and I operate a thriving educational enterprise from our home known as "Computer Tutor."

Actually our son Charlie really deserves the credit for the launching of our tutoring business. Quite an accolade, I might add, for a mere three-year-old!

Granted, Charlie is a bit precocious. He qualified for Mensa when he was just 17 months old and took to the computer like the proverbial duck to water. The only preschool software I had at the time was Counterpoint's Early Learning Games, which I had ordered from a magazine ad. Charlie gleefully matched letters and numbers, drew pictures and typed his name. I ordered more software. This time it was Apple's Mix and Match, and Family Classic's Micro Mother Goose. Before long we had accumulated an abundance of educational software both for Charlie and our ten-year-old foster daughter, Susan.

Being a veteran teacher and former school principal, I recognized the benefits of using the Apple for teaching. It was very patient. It never tired or threw up its hands in despair. The computer taught quite capably, rewarded on screen, and built confidence. Just maybe, I thought, I could combine my educational experience and interest in computers into something profitable.

To own my own business had been a secret desire for many years. Two things kept me from actually doing it. One was money. My husband, Hiram, had a good job at the airlines and we made ends meet adequately. However, we didn't have a lot of savings, just a small rainy day nest egg. The other deterrent to starting a business was my lack of "know-how."

The idea of being an entrepreneur was both exciting and frightening. The philosophy that my father had instilled in me as a child exerted itself once again in my life: "The hardest part of any endeavor is the first step."

I made a few calls. The county had

no objections to operating a tutoring service out of our home. We are located one block outside the city limits, so we didn't need a city business license. The bank was quite willing to loan us seed money.

I called the county home extension office. The director had recently held some seminars for people interested in starting their own businesses. I asked if there were any hand-outs remaining. She said yes, and sent them out that same day.

Hmm, things were moving right along. It was now time to approach the other-half. I tend to be impulsive, whereas my husband likes to look at the total picture before steaming ahead. I learned long ago to tap his wisdom.

Hiram supported the decision to open a computer tutoring business wholeheartedly.

We remodeled a portion of the house. Our den became smaller as a new wall went up and we parted with the spare fourth bedroom. The new computer room was spacious enough for two Apples, two green monitors, a color monitor, a printer, an office desk and chair, and a multitude of shelves.

We were making progress. I now had to decide what type of tutoring we would offer. There is a big difference in tutoring on a computer and tutoring about computers. Though I do teach Basic and Logo, I opted to specialize in teaching academic subjects with the aid of the Apple.

At first I had to rely on software recommendations from educators in the nearby public school systems who used Apples in the classroom. Their advice proved invaluable.

For math instruction, I initially ac-

quired Edu-ware's Compu-Math, Sterling's Arithmetic Classroom Games, Apple's Elementary, My Dear Apple, and the math skill builders series from Developmental Learning Materials.

The first reading program I selected was Edu-ware's Compu-Read. For language skills, I chose the Milton Bradley series because it taught the material rather than just quizzed on supposed prior knowledge. This supported my objective to let the computer do most of the teaching.

I also acquired several games to use as rewards for successful completion of computer modules by the children. The most popular one proved to be Xerox's Stickybear Bop.

With hardware and software taken care of, we were ready to announce to the community that we were in business. I have to admit I harbored a few fears, but I was committed to the project.

Using the modem, I tapped into a computerized typesetting service in another state. Using special printer codes, I typed the information for our proposed brochure. Within three days it was in our mailbox and I did the paste-up before taking it to our local printer.

With brochure in hand, I went to several local schools and requested that the advertisements be distributed to the students. It wasn't as easy as I'd hoped. The principals told me that there was a new policy that forbade distribution of outside material without prior approval of the school superintendent.

Not to be thwarted so easily, I called the superintendent's office. His secretary asked the nature of the call and then instructed me to write a letter, which I did. However, the superintendent responded that the Board of Education would have to make the decision at their next meeting which was a month away. I received a letter thereafter informing me that the Board could not allow distribution of private business literature.

I was glad I hadn't put all my advertising eggs in this one basket. During this waiting period I had posted notices on community bulletin boards and placed ads in the local papers. In addi-

Pictured at left are the author, Dr. Nancy White Kelly, and her son Charlie. You may write to Dr. Kelly at 72 Valley Hill Road, Stockbridge, GA 30281.

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tion, I was able to have the brochures distributed in several private schools in the area. Our babysitter posted one on the student bulletin board in the town high school. Friends helped spread the word too.

As a result, we had several calls and acquired a few students, but not nearly enough for a livelihood.

I remembered that I had read somewhere about building business by giving away something free. Using this idea, I created a new brochure with a picture of one of our students and offered a free introductory computer lesson during a period of 60 days. This was the magic formula. With only one exception, all the parents who sat through our demonstration wanted their children enrolled.

Most of our tutoring is done after school and on weekends during the school year. However, our busiest time is summer.

Many of the students we enroll fall into either the "slow learner" or "gifted" category. Our documented success rate for exceptional children has been excellent. We attribute this partly to the fact that learning by computer is fun.

When a new student is enrolled at Computer Tutor, we do an academic assessment that allows us to determine the individual's needs. Based on the results, we then set up an "educational prescription."

For example, several months ago we enrolled a twelve-year-old boy. Carl (not his real name) was recommended for tutoring by his teacher because he was performing far below the sixth grade level.

During our first session we administered a wide-range achievement test which gave us grade equivalents for reading, math and spelling. We compared these scores with his most recent achievement tests in school and found them comparable. Carl was functioning nearly two grade levels below normal.

Carl was scheduled to come to Computer Tutor twice weekly for one hour. We set two goals for Carl. One was to improve his reading comprehension significantly and the other was to build a rapid recall of math combinations and multiplication facts.

Using the system generator in Compu-Read, we adjusted the parameters whereby Carl could have moderate success and still be challenged. He learned to pay attention to what was on the screen before the text disappeared. He did so well that we had to change the parameters almost weekly.

Carl, being a basketball enthusiast, liked Slam Dunk Math published by Sterling in its Arithmetic Classroom Games series. He was able to select a game using any one of the four basic arithmetic operations. If he chose multiplication, for example, he had 30 seconds per game to give correct answers to individually displayed problems. If the answer was incorrect, a basketball player missed his dunk. A correct answer, however, resulted in an animated sequence in which a basketball player makes a spectacular slam dunk. At the end of the game, a buzzer sounded and the score was tallied. Carl had an opportunity each session to improve on his last score. If he did, he was rewarded with three rounds of the computer game of his choice.

Within three months, Carl's grades had improved dramatically. A new series of achievement tests showed a gain of nine months in reading and a gain of twelve months in math. Carl's mother was so thrilled with his progress that she enrolled her other two children.

Word-of-mouth success stories from happy parents have kept us from having to advertise. In fact, Computer Tutor has a waiting list with names of children as young as two as well as a few grandmas.

Now that we are established, we frequently get calls from schools asking that we give workshops and seminars to PTA's and other groups on the educational benefits of the computer. One nearby private school offered to swap tuition for our two children if Computer Tutor would teach a class just three hours weekly.

Little did our diapered son know that he would become the inspiration to our perspiration. We like to believe that we are working in behalf of his future and for the futurity of those students who are now benefiting from computerized learning *a la* Computer Tutor. ■

A teacher for the Apple

Meet Lee McFadden, your personal guide to the Apple //e. *Softalk Magazine* has praised Lee's audio cassette tapes as "a superior way to learn about an Apple." And Apple itself chose them to train its own field sales reps.

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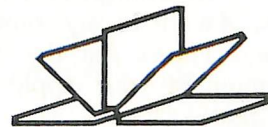
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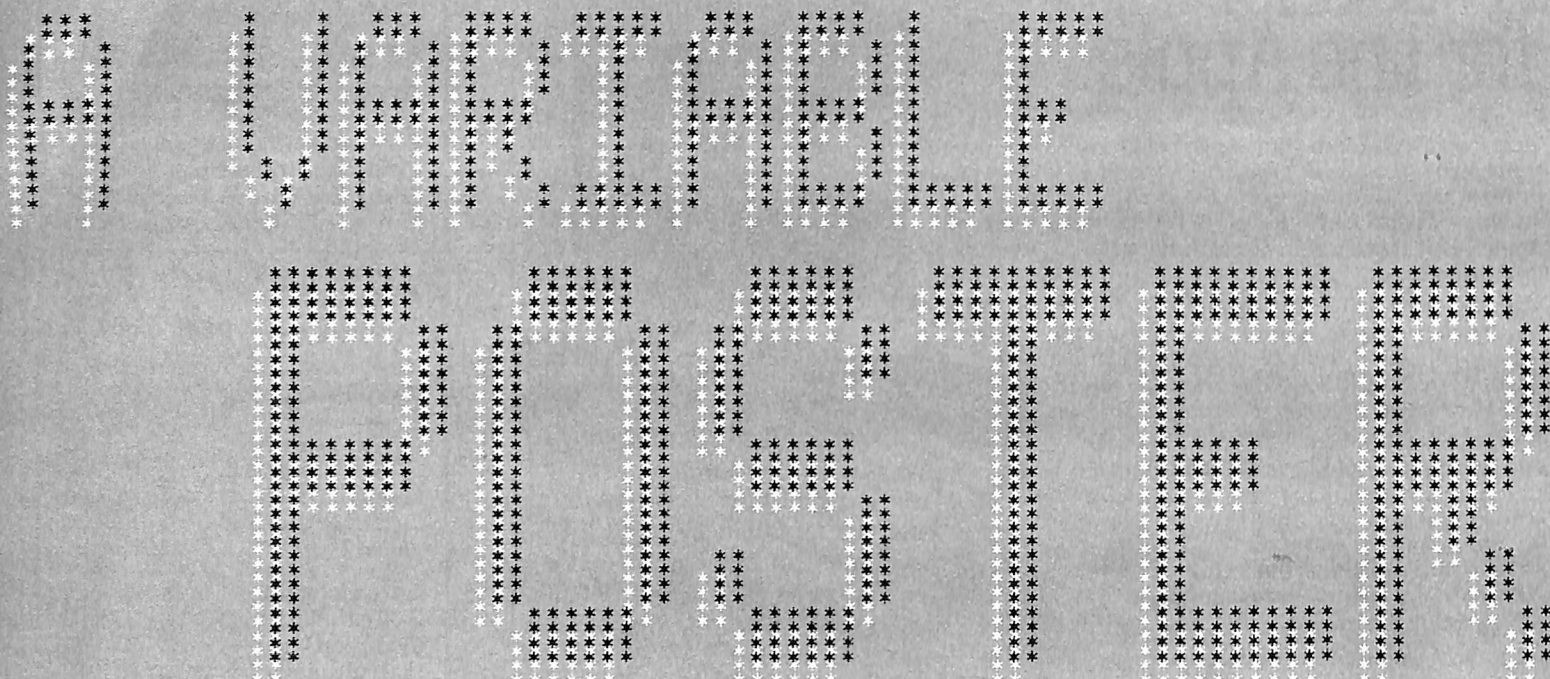
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by Jeffrey A. Mills & John J. Fedak

Program listing. The Jumbo Poster Printer.

```

20 DIM L(62,4)
30 DATA 0,0,0,0,0: REM (SPACE)
40 DATA 0,0,95,0,0: REM !
50 DATA 0,3,0,3,0: REM "
60 DATA 20,127,20,127,20: REM #
70 DATA 36,42,127,42,18: REM $
80 DATA 35,19,8,100,98: REM %
90 DATA 54,73,86,32,80: REM &
100 DATA 0,0,3,0,0: REM '
110 DATA 0,28,34,65,0: REM (
120 DATA 0,65,34,28,0: REM )
130 DATA 34,20,127,20,34: REM *

140 DATA 8,8,62,8,8: REM +
150 DATA 0,0,64,48,0: REM ,
160 DATA 0,8,8,8,0: REM -
170 DATA 0,0,64,0,0: REM .
180 DATA 32,16,8,4,2: REM /
190 DATA 62,81,73,69,62: REM 0
200 DATA 0,66,127,64,0: REM 1
210 DATA 98,81,73,73,70: REM 2
220 DATA 34,65,73,73,54: REM 3
230 DATA 24,20,18,127,16: REM 4
240 DATA 71,69,69,69,57: REM 5
250 DATA 62,73,73,73,48: REM 6

```

Celebrating? Having a party? Just want to say something in a big way? Here's just the thing—a poster printer for your Apple II Plus (with a printer).

This program was written with printer controls for an NEC PC-8023A-C, but is easily adaptable to any printer. Just change the commands in lines 1121-1124 and line 1410 to match your printer's controls.

How It Works

Lines 10-650 contain the data which define the characters to be printed. Each number in the statement represents one of five vertical lines of

dots in a five-wide-by-seven-high pattern.

Line 660 clears the screen.

Line 670 stores the data in an array where it is more easily accessible.

Lines 1010-1060 input the size of letters in which you want your poster printed.

Lines 1070-1090 input whether you want normal (letter dark) or inverse (background dark) printing on the poster.

Lines 1100-1120 input the message you want printed on the poster.

Lines 1121-1130 set up the printer.

Lines 1140-1390 translate your message into individual letters which are

broken down according to the patterns stored in the array in line 670. These patterns then are translated into spaces and asterisks which are sent to the printer.

The length of your message is limited—you can only input 255 characters into a string.

Experiment with different combinations of heights and widths until you find the style that is most pleasing to you. Then print a poster and celebrate in style! ■

Print a jumbo letter and mail it to Jeffrey A. Mills and John J. Fedak, 789 Ebner St., Columbus, OH 43206.

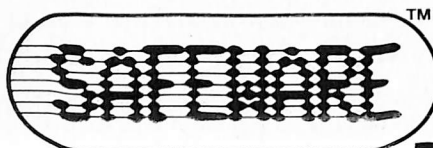
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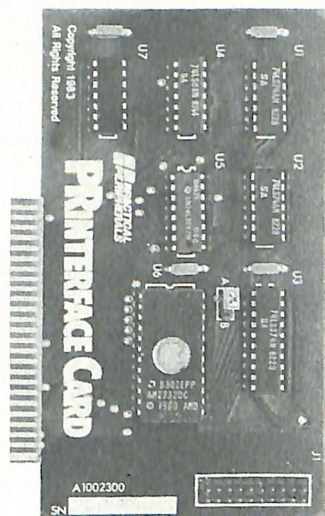
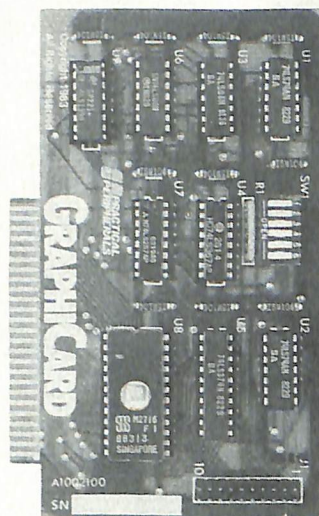
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Listing continued.

```

1120 HOME
1121 REM %NEC PC-8023A-C PRINT C
      ONTROLS%
1122 FF% = CHR% (12): REM %FORM
      FEED%
1123 LP% = CHR% (27) + "B": REM
      %8 LPI%
1124 PR# 1
1125 PRINT LP%;
1130 B% = " ": F% = "%": IF NI% =
      "I" THEN B% = "%": F% = " "
1140 M = LEN (M%)
1150 FOR A = 1 TO M
1160 FOR Y = 1 TO W
1165 PRINT SPC( (80 - 9 * H) /
      2);
1170 FOR X = 1 TO H: PRINT B%;: NEXT
1180 FOR Z = 0 TO 6: FOR X = 1 TO
      H: PRINT B%;: NEXT : NEXT
1190 FOR X = 1 TO H: PRINT B%;: NEXT
      : PRINT
1200 NEXT
1210 Z = ASC ( MID% (M%,A,1)) -
      32: IF Z < 0 OR Z > 62 THEN
      Z = 0
1220 FOR B = 0 TO 4
1230 FOR Y = 1 TO W
1235 PRINT SPC( (80 - 9 * H) /
      2);
1240 D = L(Z,B)
1250 FOR X = 1 TO H: PRINT B%;: NEXT
1260 FOR C = 6 TO 0 STEP - 1: E =
      0
1270 IF D >= 2 ^ C THEN E = 1:
      D = D - (2 ^ C)
1280 FOR X = 1 TO H
1290 IF E = 0 THEN PRINT B%;
1300 IF E = 1 THEN PRINT F%;
1310 NEXT : NEXT
1320 FOR X = 1 TO H: PRINT B%;: NEXT
      : PRINT
1330 NEXT : NEXT
1340 NEXT
1350 FOR Y = 1 TO W
1355 PRINT SPC( (80 - 9 * H) /
      2);
1360 FOR X = 1 TO H: PRINT B%;: NEXT
1370 FOR Z = 0 TO 6: FOR X = 1 TO
      H: PRINT B%;: NEXT : NEXT
1380 FOR X = 1 TO H: PRINT B%;: NEXT
      : PRINT
1390 NEXT
1400 PRINT FF%;
1410 PR# 0
1420 HOME : END

```

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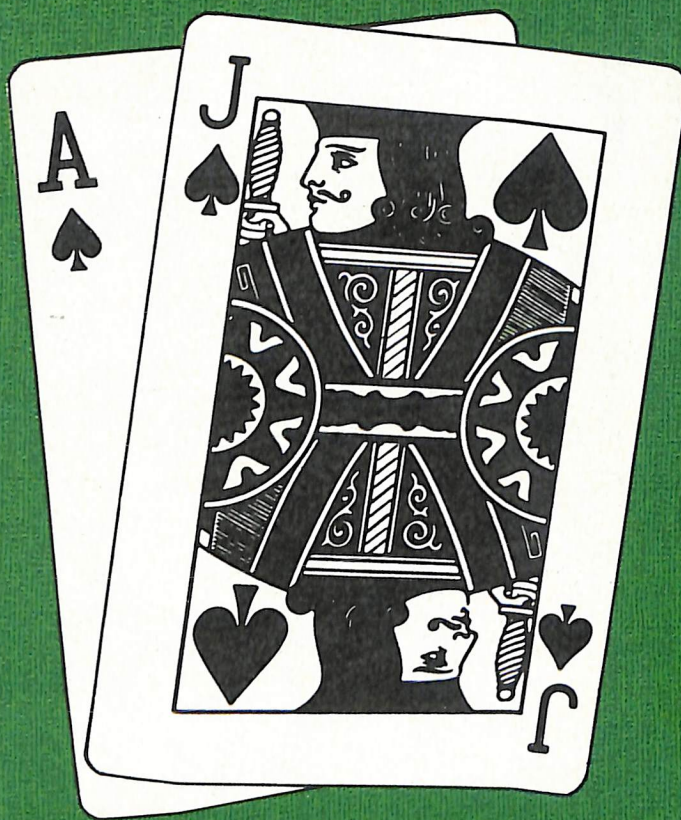
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New Year's Eve

We wish you a happy
and safe holiday season.

by Susan W. Rollinson

Have you ever wondered just how long it takes the effects of a party to wear off? It's probably longer than you think! An Applesoft program can help you visualize the effects of alcohol on your body.

I originally wrote "New Year's Eve" in Fortran for a graduate chemistry course, but I have modified it for the Apple and have used it to perk up college chemistry courses. It lets you see the effects of body weight, number of drinks and rate of drinking on blood alcohol content. Interestingly, most alcoholic drinks contain the same amount of alcohol regardless of type—beer, wine or "mixed." The weaker beverages are almost invariably served

in larger amounts, effectively dispelling the myth that "you can't get drunk on beer."

Biochemical Model

This model makes three assumptions about human biochemistry. First, it assumes that one-half of the human body is circulating fluids. Second, it assumes that alcohol is uniformly distributed throughout all body fluids, including the blood. Finally, it assumes that the rates of absorption of alcohol from the stomach and elimination from the blood (metabolism) are the same for everyone. The last assumption is probably the most prone to individual variation. Despite these

assumptions, my students assure me that the numbers come remarkably close to their experience!

In most states, the legal definition of intoxication is .1 percent blood alcohol, or 1 gram of alcohol per liter blood. Unconsciousness sets in about .25 percent blood alcohol, and death follows at about .4 percent blood alcohol. The Apple's display is set so that .1 percent blood alcohol is drawn as a solid line across the screen, while the top of the screen extends slightly beyond the .25 percent blood alcohol limit.

Mathematical Model

Mathematically, the program performs a numerical integration of the system illustrated in Figure 1, where the rate of drinking is set by the user, and the remaining rates are constants set by the program. The differential equations involved are:

$$\frac{d(\text{alcohol}(\text{stomach}))}{dt} = k_1 - k_2 * (\text{alcohol}(\text{stomach}))$$

$$\frac{d(\text{alcohol}(\text{blood}))}{dt} = k_2 * (\text{alcohol}(\text{stomach})) - k_3$$

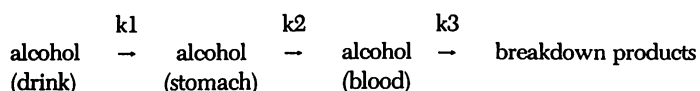


Figure 1. A simplified illustration of how alcoholic drinks are neutralized.

Program listing. New Year's Eve.

```

100 REM *****
110 REM **      NEW YEAR'S EVE      **
120 REM **      HI-RES CHARACTER VERSION      **
130 REM **
140 REM **      BY S.W. ROLLINSON      **
150 REM *****
160 REM
170 REM ** USES APPLESOFT TOOL KIT BY APPLE COMPUTER (1980) **
180 REM ** REQUIRES "RBOOT", "RLOAD", "HRCB", AND "ASCII.SET" **
190 REM ** TO USE WITHOUT TOOL KIT:
200 REM ** DELETE LINES 1030-1040,2040,2170-2260,5000-5190
210 REM ** CHANGE LINE 1050: 1050 HOME
220 REM
230 REM VARIABLE ASSIGNMENTS:
240 REM LB= BODY WEIGHT, POUNDS
250 REM FL= BODY FLUIDS, LITERS

```

Listing continued.

Program Details

The initialization section, lines 1000-1180, loads in a hi-res character generator, clears all variables (essential if the numerical integration routine is repeated), and restores the data pointer. You are then asked to

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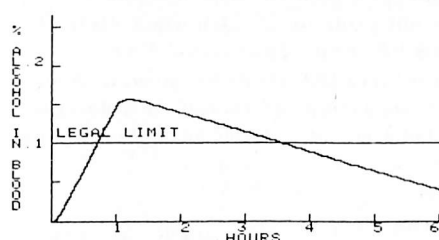


Figure 2. Sample screen using Applesoft Tool Kit.

enter body weight, number of drinks, and number of hours to drink.

"New Year's Eve" uses the Applesoft Tool Kit by Apple Computer to embellish the hi-res screen with text

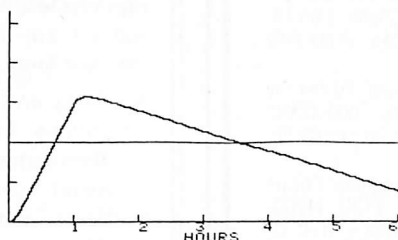


Figure 3. Sample screen without Tool Kit.

(see Figure 2). If you have an alternative character generator, you may substitute the appropriate subroutines at lines 5000-5190. Line 1050 may also need modification to clear the screen.

If you don't have a hi-res character generator, simply delete lines 1030-1040, 2040, 2170-2250, and 5000-5190. Then change line 1050 to read: 1050 HOME. Your screen will

lack text on the graphics portion of the screen (Figure 3). (Finally, you might consider acquiring a character generator—they really improve graphs and charts.)

The hi-res graphics screen is prepared in lines 2000-2250. Line 2040 pokes the value needed to give full-screen graphics, and lines 2170-2250 print text over the prepared chart. Again, these may need modification if you don't use the Tool Kit.

The heart of the program is the numerical integration and plotting routine in lines 3000-3180. Each hour is divided into 20 parts ($DT = .05$ hr), and calculations of the amount of alcohol in the stomach and blood are made for each interval. The new data is then checked for limits on the hi-res screen, and plotted (lines 3140-3170).

Finally, the program asks if you wish to repeat with new data (lines 4000-4070). ■

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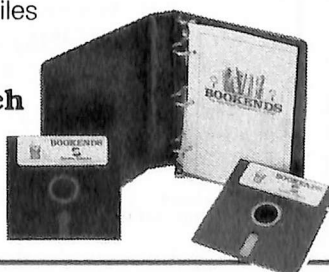
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270 REM ES,EOLD,EAVG = ALCOHOL IN STOMACH
280 REM AB,AOLD,AAVG = ALCOHOL IN BLOOD
290 REM K1 = RATE OF ALCOHOL CONSUMPTION, (0 ORDER)
300 REM K2 = RATE OF ALCOHOL TRANSFER FROM STOMACH TO BLOOD, (1ST ORDER)
310 REM K3 = RATE OF ALCOHOL METABOLISM (REMOVAL FROM BLOOD), (0 ORDER)
1000 REM
1010 REM
1020 REM ** INITIALIZATION SECTION **
1030 GOSUB 5030: REM CALL-UP HI-RES CHARACTERS
1040 SPEED= 255
1050 PRINT CHR$(16): REM CLEAR PAGE
1060 TEXT: RESTORE: CLEAR
1070 VTAB 5: PRINT "THIS PROGRAM SIMULATES"
1080 PRINT "YOUR BODY'S REACTION TO"
1090 PRINT "NEW YEAR'S EVE."
1100 VTAB 10
1110 INPUT "BODY WEIGHT IN POUNDS: ";LB
1120 FL = LB / 4.4: REM CALCULATE LITERS
1130 INPUT "HOW MANY DRINKS? ";DN
1140 INPUT "HOW MANY HOURS TO CONSUME? ";DH
1150 K1 = DN * 20 / DH
1160 K2 = 10
1170 K3 = 8
1180 DT = .05
2000 REM
2010 REM
2020 REM ** SET SCREEN **
2030 HGR: HCOLOR= 3
2040 POKE - 16302,0: REM FULL SCREEN
2050 HPLLOT 25,0 TO 25,159 TO 265,159
2060 HPLLOT 25,99 TO 265,99
2070 FOR J = 1 TO 5
2080 Y = 159 - J * 30
2090 HPLLOT 25,Y TO 30,Y
2100 NEXT J
2110 FOR J = 1 TO 6
2120 X = J * 40 + 25
2130 HPLLOT X,159 TO X,154
2140 NEXT J
2150 VTAB 21: PRINT "          1      2      3      4      5      6"
2160 PRINT "          HOURS"
2170 VTAB 2
2180 FOR I = 1 TO 18
2190 READ T#
2200 PRINT T#
2210 NEXT
2220 DATA %, ,A,L,C,O,H,O,L, ,I,N, ,B,L,O,O,D
2230 VTAB 12: HTAB 5: PRINT "LEGAL LIMIT"
2240 VTAB 13: HTAB 2: PRINT ".1"
2250 VTAB 5: HTAB 2: PRINT ".2"
3000 REM
3010 REM
3020 REM ** START NUMERICAL INTEGRATION **
3030 FOR I = 1 TO 120
3040 EAVG = 1.5 * ES - .5 * EOLD
3050 AAVG = 1.5 * AB - .5 * AOLD
3060 EOLD = ES
3070 AOLD = AB
3080 ES = ES + (K1 - K2 * EAVG) * DT
3090 AB = AB + (K2 * EAVG - K3) * DT
3100 T = T + DT
3110 IF T > DH THEN K1 = 0
3120 AC = AB / FL: X = T * 40 + 25: Y = 159 - AC * 60
3130 IF AC > 4 GOTO 4060
3140 IF Y < 0 THEN Y = 0
3150 IF Y > 159 THEN Y = 159
3160 IF I = 1 THEN HPLLOT 25,159
3170 HPLLOT TO X,Y
3180 NEXT I
4000 REM
4010 REM
4020 REM ** END ROUTINES **
4030 VTAB 23: PRINT "AGAIN?";: GET Z#
4040 IF Z# = "Y" GOTO 1050
4050 END
4060 VTAB 23: PRINT "YOU HAVE EXCEEDED THE LETHAL LIMIT!"
4070 PRINT "SWEET DREAMS!";: PRINT "          AGAIN? ";: GET Z#: GOTO 4040
5000 REM
5010 REM
5020 REM ** BRING IN HI-RES CHARACTER GENERATOR **
5030 ONERR GOTO 5150
5040 TEXT: HOME: HGR: ADRS = 0
5050 PRINT CHR$(4); "BLOOD RBOOT": CALL 520: REM BRING IN RLOAD
5060 ADRS = USR(0), "HRCG"
5070 POKE 216,0: REM TURN OFF ON ERR
5080 IF ADRS < 0 THEN ADRS = ADRS + 65536: REM MAKE ADRS POSITIVE
5090 CS = ADRS - 768: HIMEM: CS: REM MAKE ROOM FOR CHARACTER SET
5100 D# = CHR$(4)
5110 PRINT D#; "BLOOD ASCII.SET,A"; CS: REM LOAD IN SET
5120 CH = INT (CS / 256): CL = CS - CH * 256: REM CHAR SET LOW BYTE & HIGH BYTE
5130 POKE ADRS + 7,CL: POKE ADRS + 8,CH: CALL ADRS + 3: REM INIT HRCG
5140 RETURN
5150 REM ERROR TRAP FOR RLOAD
5160 TEXT
5170 PRINT "ERROR IN RLOAD OR RBOOT"
5180 POKE 216,0
5190 STOP

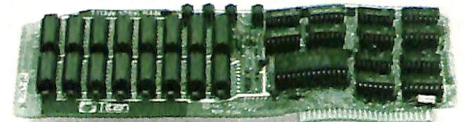
```



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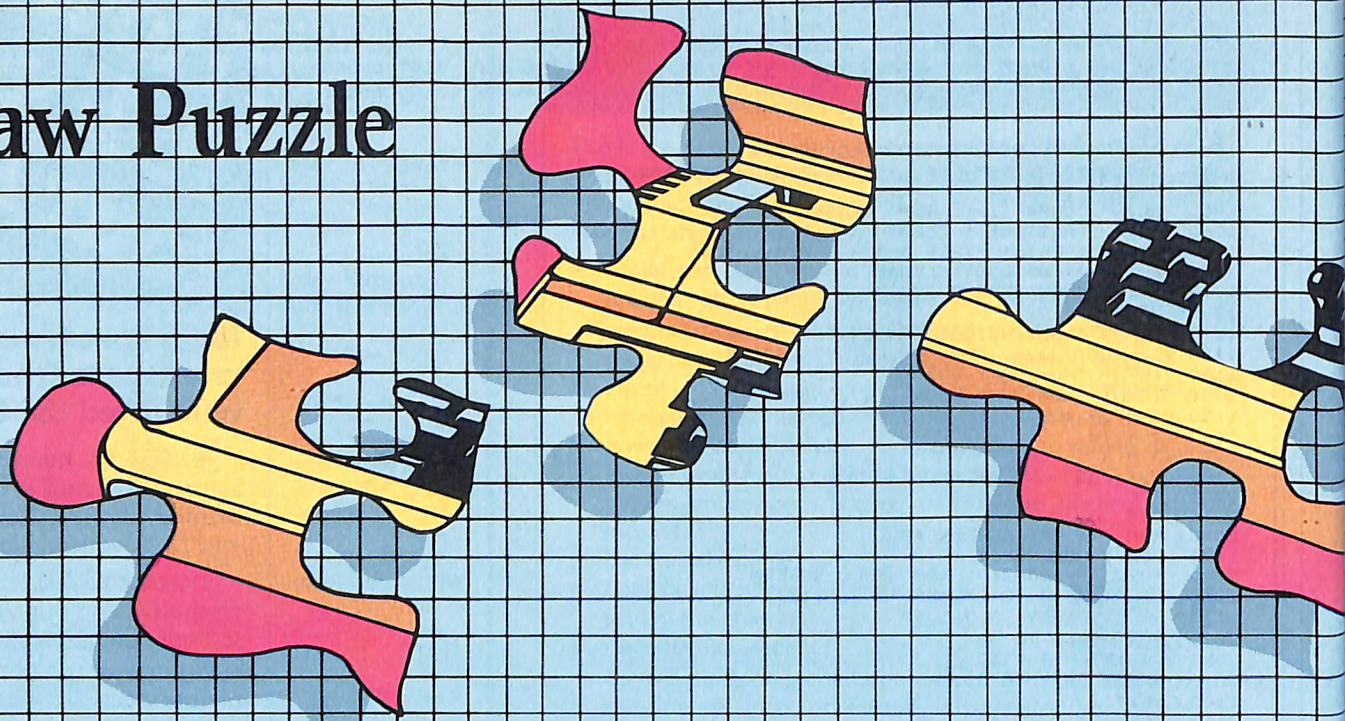
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Jigsaw Puzzle



by Ronald Stear

For just a couple of dollars you can run to the "Any-Mart" quick shop store and pick up hours of entertainment in the form of several hundred cardboard pieces that the manufacturer swears will yield a beautiful colorful scene if you can just get it all together.

For even less, you can boot up any hi-res picture, scramble it, and piece together your own artwork.

The jigsaw program in the listing will take any binary hi-res picture and

transform it into a workable jigsaw puzzle. Joystick or paddles with push-buttons (sorry, no keyboard option) handle all movement of the puzzle pieces. The program asks if a puzzle has been previously saved. If so, the saved puzzle is restored, and work continues. If none were saved, you are guided through the procedure of finding a hi-res picture to use as a puzzle. Once initialized, the puzzle is redrawn, the original erased, and control is given to you.

As with any jigsaw puzzle, a clean workspace is needed, so hi-res page 1 is left blank. Button zero switches from whichever screen you are using to the other. Button one will either pick up a puzzle piece or drop one, depending upon whether one is available or already being held. You may not pick up a piece if nothing is there (beware of black pieces!), and you are not allowed to drop one on top of another. There are no further restrictions. Pieces may be moved at will within a page or transferred from one to the other. The final result is up to you.

If you are at all like me, the original picture will fade from memory as you work. Pressing the R key at any time will, after some disk whirring, display the original picture for about 10 seconds, then restore the puzzle.

If something more pressing demands your attention, you may wish to leave the puzzle without losing all your efforts at solving it. Pressing the Q key lets you either save the puzzle or quit. In either case, both screens are erased and the program ends.

Anatomy

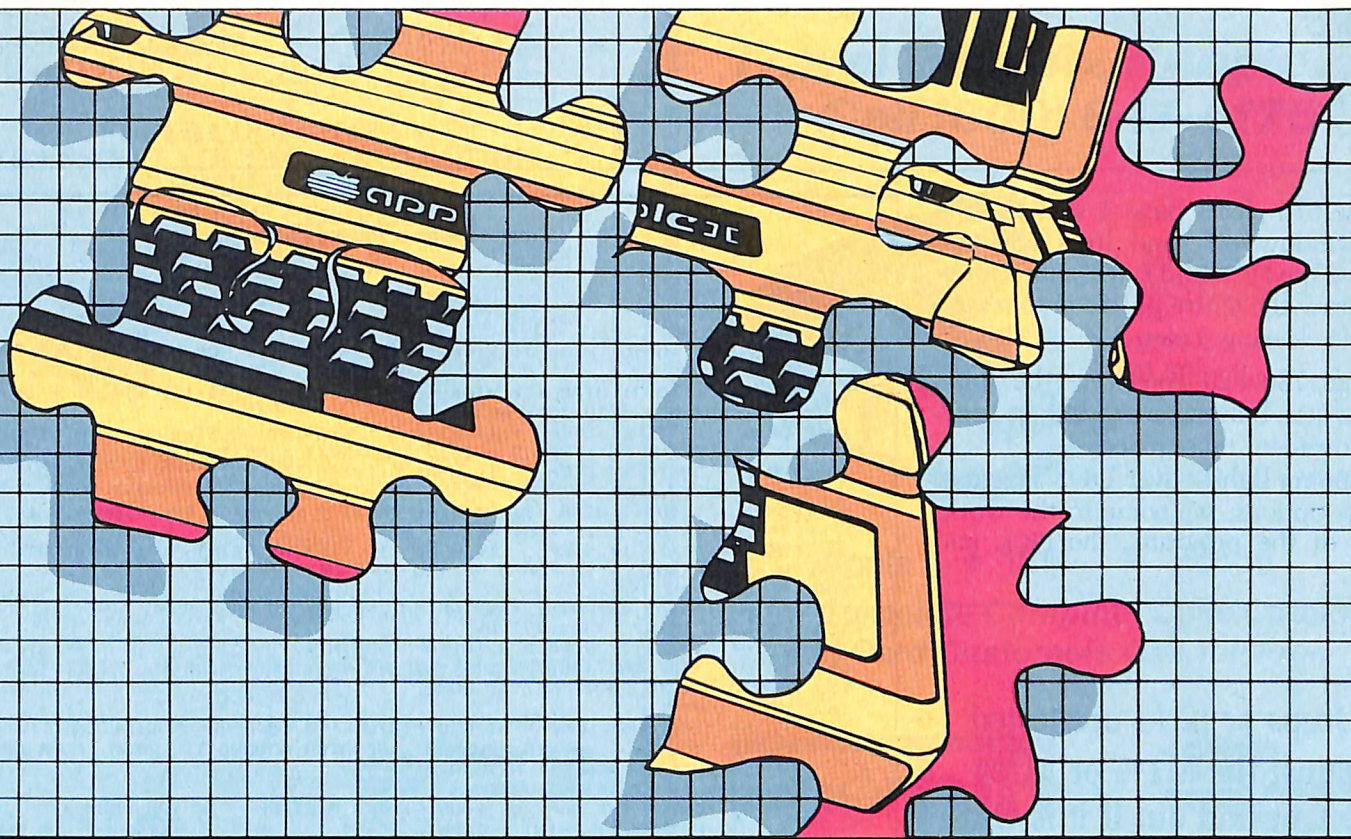
Howzit work? It's all Applesoft but

Table. A list of variables, peeks and pokes used in Jigsaw Puzzle.

A1-A2	Used during initialization to create XI and YI for pick/drop subroutine.
B0	Paddle button zero peek result.
B1	Paddle button one peek result.
C\$	Response to 'Catalog' request.
CP	Pick/drop subroutine current position. This position is obtained from the line addresses in 'LM' using 'XI' (x-index), 'YI' (y-index), and 'PAGE', which is either 0 (P2) or -8192 (P1).
CU	Used as poke pointer to set up shape table for cursor.
K\$	Most keyboard input.
KB	Keyboard peek result used to test for 'R' and 'Q'.
LM	Line map. 24 HI-RES Page 2 addresses corresponding to the left edge of the screen. Used to obtain a peek or poke address to 'map' puzzle pieces from one place to another.
M1%	Positional map of pieces on Page 1. (0=none, 1=something there)
M2%	Positional map of pieces on Page 2.

Table continued.

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full of tricks. Using both hi-res pages for display eats up memory—not in itself a bad thing, except that Applesoft has a bad habit of placing variables at the end of a program. Thus you may find them disappearing with HGR commands. Setting LOMEM to just above page 2 eliminates this problem, but watch out for strings. They are kept few and short here.

Lines 830–990 initialize the variables used in keeping track of what pieces are where on both screens. (See the Table.) Within this subroutine, lines 850–870 set up array LM, which contains the starting address of each puzzle row for hi-res page 2. This allows for direct mapping from one page to the other since the difference between the pages is 8192 (variable P1). P1 and P2 are then used as pointers to determine which screen to use. Variables M1% and M2% are integers to keep their size small (remember strings?), and are used to map each page so that pieces don't get overlaid. Lines 910–980 poke the shape table for the cursor and set up the shape pointers.

Lines 30–150 set and display the title page.

Lines 170–430 are instructions designed to make the program a little easier to use.

Lines 460–480 do an excellent job of shuffling the puzzle pieces.

Table continued.

P\$	String containing the original picture name. Used to recall the picture when the 'R' (review) key is pressed, and is saved with the page maps (M1% & M2%) when the puzzle is quit.
P1-P2	P1 is initialized to -8192 (the addressing difference between the two HI-RES pages), P0 to 0. One of these is put into variable 'PAGE' which is then used to determine which page is being displayed and as a peek/poke index for the pick/drop routines.
PAGE	Page currently in use (0=Page 1, -8192=Page 2).
PC	32 byte array used to hold a piece while it is being moved.
SW	Unused data, but a bood table into which to peek locations 49237 and 49236 which switch the HI-RES picture being displayed.
T	Temporary variable used in shuffling the puzzle pieces.
TK	Stands for TICK, for peeking the speaker location
XA	Incremental add for cursor horizontal positioning.
XI	Cursor horizontal index position. Used to positon the cursor and in the pick/drop subroutine to find a piece.
XP	X coordinate to draw the cursor.
XT	Used during initialization. Split int XI and YI to re-draw the scrambled puzzle using the pick/drop subroutines.
YA	Incremental add for cursor vertical positioning.
YI	Cursor vertical index position (see XI).
YP	Y coordinate to draw the cursor.

PEEKs 'N POKES

-16286	Paddle button 1.
-16287	Paddle button 0.
-16368	Monitor keyboard strobe.
-16384	Monitor keyboard input.
-16336	Monitor speaker location.
49237	Peek to display HI-RES page 2.
49236	Peek to display HI-RES page 1.
49234	Poke to set text window off.
230	Poke 64 to set Xdraw to draw on page 2, 32 for page 1.

Line 570 clears page 1 and sets the text window off, and lines 580-660 will use the PICK and DROP subroutines to redraw the entire puzzle onto screen 1 while clearing screen 2.

Lines 730-820 constitute the main loop where buttons are tested and cursor movement takes place.

Skipping lightly over DOS save and review options, we come to the workhorse of the program, the PICK and

"Drops or picks are tested against the M1% or M2% tables to find out if it is O.K. to pick or drop from that position on that page."

DROP subroutines. By using the variables P1 and P2 as pointers into the table LM, and referencing them to the screen position kept in XI (X index) and YI (Y index), these subroutines directly remap blocks of the picture from one place to another within either hi-res page. Drops or picks are tested against the M1% or M2% tables to find out if it is O.K. to pick or drop from that position on that page. Variable array PC, neglected till this time, holds the piece picked (bytes peeked) till a drop is made.

Four permanent files are created on the disk used with this program. One is used to save the hi-res puzzle before loading the original. One is the bit-map of each page (array M1% and M2%), and the others hold both hi-res screens. When a puzzle is saved, all information used in the puzzle is restored from these files and the name of the original picture is restored as well. It is not necessary to use the same disk for pictures and program, but the original picture and all files created by this program must be on the same disk.

My apologies for a definite lack of DOS error handling but space was at a premium. ■

Program listing, Jigsaw Puzzle.

```

10 LOMEM: 24576
20 GOSUB 830
30 TEXT : HOME
40 FOR J = 1 TO 10: HTAB J: VTAB 10: PRINT " J";: FOR D = 1 TO 100: NEXT
   : NEXT
50 FOR I = 1 TO 9: HTAB 13: VTAB I: PRINT " ";: HTAB 13: VTAB I + 1: PRINT
   "I": FOR D = 1 TO 100: NEXT : NEXT
60 FOR G = 23 TO 11 STEP - 1: HTAB 15: VTAB G: PRINT " ";: HTAB 15: VTAB
   G - 1: PRINT "G": FOR D = 1 TO 100: NEXT : NEXT
70 FOR S = 38 TO 17 STEP - 1: HTAB S: VTAB 10: PRINT "S ";: FOR D = 1 TO
   100: NEXT : NEXT
80 FOR A = 1 TO 9: HTAB 19: VTAB A: PRINT " ";: HTAB 19: VTAB A + 1: PRINT
   "A";: FOR D = 1 TO 100: NEXT : NEXT
90 FOR W = 23 TO 11 STEP - 1: HTAB 21: VTAB W: PRINT " ";: HTAB 21: VTAB
   W - 1: PRINT "W";: FOR D = 1 TO 100: NEXT : NEXT
100 PRINT
110 PRINT : HTAB 4: PRINT "AN IRRITATING WAY TO PASS SOME TIME"
120 PRINT : PRINT TAB( 19)"BY"
130 PRINT TAB( 13)"RONALD B. STEAR": PRINT
140 PRINT TAB( 18)"1983"
150 FOR D = 1 TO 2000: NEXT : HOME
160 GOTO 1000
170 PRINT "YOU MUST HAVE A HI-RES PICTURE TO LOAD FROM DISK ONTO PAGE 2
   (HGR2) TO RUN THIS PROGRAM. SCRATCH AROUND TILL YOU COME UP WIT
   H SOMETHING, THEN HIT RETURN."
180 PRINT : INPUT K$
190 PRINT "ENTER THE NAME OF YOUR HI-RES PICTURE IF YOU KNOW IT. IF NO
   T, HIT RETURN.": PRINT : INPUT ">";P$
200 IF P$ = "" THEN 220
210 GOTO 290
220 PRINT : INPUT "DO YOU WISH FOR ME TO 'CATALOG' THE DISK FOR YOU?
   (Y/N) ";C$
230 IF C$ = "Y" THEN 260
240 IF K$ = "Y" THEN HOME : GOTO 170
250 IF C$ < > "Y" THEN PRINT "WELL I GUESS YOU DIDN'T WANT TO RUN THISA
   NYWAY. BYE": END
260 PRINT CHR$( 13) + CHR$( 4);"CATALOG"
270 PRINT "LOOK CAREFULLY THEN HIT RETURN": GET K$
280 GOTO 190
290 HGR2 : PRINT CHR$( 4);"BLOAD ";P$;"A$4000"
300 FOR D = 1 TO 1000: NEXT
310 TEXT : HOME
320 PRINT "WELL, WE GOT IT!!": PRINT
330 PRINT "THESE ARE THE ONLY INSTRUCTIONS YOU WILLGET FOR THE REMAINDER
   OF YOUR STAY.": PRINT
340 SPEED= 150
350 PRINT "1. THE JOYSTICK OR PADDLE CONTROLS WILL": PRINT " POSITON TH
   E SQUARE OVER THE PIECE": PRINT " TO BE MOVED.": PRINT
360 PRINT "2. BUTTON ZERO WILL SWITCH HI-RES PAGES": PRINT " THE CURSOR
   IS ACTIVE ON THAT PAGE.": PRINT : PRINT "PRESS BUTTON ZERO NOW TO VE
   RIFY ITS": PRINT " POSITION >"
370 B0 = PEEK ( - 16287): IF B0 > 127 THEN PRINT "": GOTO 400
375 REM
380 GOTO 370
390 GOTO 300
400 PRINT "3. BUTTON ONE WILL EITHER PICK UP OR": PRINT " DROP A PUZZLE
   PIECE ON EITHER PAGE.": PRINT : PRINT " PRESS BUTTON ONE NOW TO VE
   RIFY ITS": PRINT " POSITION >";
410 B1 = PEEK ( - 16286): IF B1 > 127 THEN PRINT "": GOTO 430
420 GOTO 410
430 PRINT
440 HOME : PRINT "PLEASE EXCUSE ME WHILE I SET UP"
450 REM INITIALIZE BOTH OLD AND NEW PLACEMARKS
460 FOR I = 0 TO 239:M2%(I) = I:M1%(I) = I:TK = PEEK ( - 16336): NEXT I
470 GR : PRINT "I'M STILL WORKING ON IT. PLEASE WAIT!"
480 FOR I = 239 TO 0 STEP - 1:X = INT ( RND (2) * I + 1):T = M2%(X):M2%
   (X) = M2%(I):M2%(I) = T:TK = PEEK ( - 16336)
482 A1 = M2%(X) / 20:YI = INT (A1) * 2:A2 = A1 - INT (A1):XI = 20 * A2
484 C = INT ( RND (2) * 15): COLOR= C
485 YI = INT (YI * 1.5): VLIN YI,YI + 3 AT XI * 2: VLIN YI,YI + 3 AT (XI *
   2) + 1
486 NEXT
487 TEXT : HOME
490 PRINT " WHEW!! THATS ROUGH!": PRINT "WELL, HERE WE GO. I'M GOING TO
   SHOW YOU THE ORIGINAL PICTURE NOW. WHEN YOU ARE READY I WILL SWITCH
   TO THE SCRAMBLED"
500 PRINT "ONE AND ERASE THE ORIGINAL. THE REST IS UP TO YOU.": PRINT
502 PRINT : PRINT "WHEN YOU FORGET WHAT THE ORIGINAL LOOKS","LIKE, PRESS
   THE 'R' KEY TO REVIEW IT."
504 PRINT : PRINT "WHEN READY TO QUIT, PRESS THE 'Q' KEY","YOU WILL THEN
   BE GIVEN A SAVE OPTION."
508 PRINT : PRINT
510 PRINT "PRESS A KEY TO VIEW THE ORIGINAL PRESS AGAIN TO CONTINU
   E"
520 GET K$: HOME : HGR : POKE 49234,0:X = PEEK (49237): GET K$: TEXT
530 PRINT "PLEASE WATCH WHILE I REDRAW THE PUZZLE"
540 PRINT "THIS IS GONNA TAKE ABOUT 4 MINUTES!"
550 SPEED= 255
560 FOR D = 1 TO 1000: NEXT

```

Listing continued.

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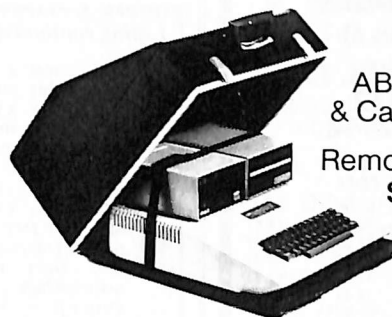
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Listing continued.

```

570 HGR : POKE 49234,0
580 FOR XT = 0 TO 239
590 A1 = XT / 20:YI = ( INT (A1) * 2):A2 = A1 - INT (A1):XI = 20 * A2
600 PAGE = P2: GOSUB 1510: REM PICK
610 A1 = M2%(XT) / 20:YI = INT (A1) * 2:A2 = A1 - INT (A1):XI = 20 * A2
620 PAGE = P1: GOSUB 1690: REM DROP
630 NEXT XT
640 FOR XT = 0 TO 239:M1%(XT) = 1:M2%(XT) = 0: NEXT XT
650 PRINT " "
660 YI = 0:XI = 0
670 REM MAIN LOOP
680 POKE - 16368,0
690 KB = PEEK ( - 16384): IF KB < 127 THEN 730
700 IF KB = 209 THEN 1210: REM QUIT
710 IF KB = 210 THEN GOSUB 1140: REM REVIEW
720 GOTO 680
730 B0 = PEEK ( - 16287): IF B0 > 127 THEN GOSUB 1480: REM SWITCH PAGE
740 FOR DL = 1 TO 100: NEXT
750 B1 = PEEK ( - 16286): IF B1 > 127 THEN GOSUB 1350: REM PICK/DROP
755 REM
760 IF PDL (0) > 180 AND XP + XA < 281 THEN XP = XP + XA:XI = XI + 1
770 IF PDL (0) < 100 AND XP - XA > 13 THEN XP = XP - XA:XI = XI - 1
780 IF PDL (1) > 180 AND YP + YA < 192 THEN YP = YP + YA:YI = YI + 2
790 IF PDL (1) < 100 AND YP - YA > 7 THEN YP = YP - YA:YI = YI - 2
800 XDRAW 1 AT XP - 1,Y
810 XDRAW 1 AT XP - 1,Y
820 GOTO 690
830 DIM M1%(240),M2%(240)
840 DIM PC(32),LM(24)
850 FOR I = 0 TO 23: READ LM(I): NEXT
860 DATA 16384,16512,16640,16768,16896,17024,17152,17280,16424,16552,16
880,16808
870 DATA 16936,17064,17192,17320,16464,16592,16720,16848,16976,17104,17
232,17360
880 P1 = - 8192:P2 = 0
890 XA = 280 / 20:YA = 191 / 12:XP = XA:YP = YA
900 YI = 0:XI = 0
910 POKE 232,0: POKE 233,3
920 POKE 768,1: POKE 769,0: POKE 770,4: POKE 771,0
930 FOR CU = 772 TO 778: POKE CU,63: NEXT CU
940 FOR CU = 779 TO 786: POKE CU,36: NEXT CU
950 FOR CU = 787 TO 793: POKE CU,45: NEXT CU
960 FOR CU = 794 TO 801: POKE CU,54: NEXT CU
970 POKE 802,0
980 SCALE= 1: ROT= 1
990 RETURN
1000 PRINT "DID YOU SAVE A PUZZLE?"
1010 POKE - 16368,0
1020 INPUT K$: IF K$ < > "Y" THEN 170
1030 PRINT CHR$ (13) + CHR$ (4)"OPEN SAVE MAP"
1040 PRINT CHR$ (4)"READ SAVE MAP"
1050 INPUT P$
1060 FOR J = 0 TO 239: INPUT M1%(J): NEXT
1070 FOR J = 0 TO 239: INPUT M2%(J): NEXT
1080 PRINT CHR$ (4)"CLOSE SAVE MAP"
1090 HGR : PRINT CHR$ (4)"BLOAD SAVE PAGE 1"
1100 POKE - 16203,0
1110 HGR2 : PRINT CHR$ (4)"BLOAD SAVE PAGE 2"
1120 PRINT CHR$ (4)"CLOSE"
1130 PAGE = P2: GOTO 680
1140 PAGE = P2:SW = PEEK (49237): POKE 230,64
1150 PRINT CHR$ (4)"BSAVE REVIEW PAGE,A$4000,L$2000"
1160 PRINT CHR$ (4)"BLOAD ";P$;"A$4000"
1170 FOR J = 1 TO 5000: NEXT
1180 PRINT CHR$ (4)"BLOAD REVIEW PAGE"
1190 PRINT CHR$ (4)"CLOSE"
1200 RETURN
1205 REM
1210 SW = PEEK (49236): POKE - 16301,0
1220 POKE - 16368,0
1230 HOME :K$ = "": HTAB 1: VTAB 22: PRINT "DO YOU WISH TO SAVE THIS PUZZ
LE? (Y/N) ": GET K$
1240 IF K$ < > "Y" THEN 1330
1250 PRINT CHR$ (13) + CHR$ (4)"OPEN SAVE MAP"
1260 PRINT CHR$ (4)"WRITE SAVE MAP"
1270 PRINT P$
1280 FOR J = 0 TO 239: PRINT M1%(J): NEXT
1290 FOR J = 0 TO 239: PRINT M2%(J): NEXT
1300 PRINT CHR$ (4)"CLOSE SAVE MAP"
1310 PRINT CHR$ (4)"BSAVE SAVE PAGE 1,A$2000,L$2000"
1320 PRINT CHR$ (4)"BSAVE SAVE PAGE 2,A$4000,L$2000"
1330 HGR : HGR2 : TEXT : HOME : END
1340 REM PICK/DROP
1350 IF PC = 1 THEN 1420: REM DROP
1360 IF PAGE = P1 AND M1%(((YI / 2) * 20) + XI) = 0 THEN PRINT "": RETURN
1370 IF PAGE = P2 AND M2%(((YI / 2) * 20) + XI) = 0 THEN PRINT "": RETURN
1380 GOSUB 1510: REM PICK
1390 IF PAGE = P1 THEN M1%(((YI / 2) * 20) + XI) = 0
1400 IF PAGE = P2 THEN M2%(((YI / 2) * 20) + XI) = 0

```

Listing continued.

Listing continued.

```

1410 PC = 1: RETURN
1420 IF PAGE = P1 AND M1%(((YI / 2) * 20) + XI) = 1 THEN PRINT "": RETURN
1430 IF PAGE = P2 AND M2%(((YI / 2) * 20) + XI) = 1 THEN PRINT "": RETURN
1440 GOSUB 1690: REM DROP
1450 IF PAGE = P1 THEN M1%(((YI / 2) * 20) + XI) = 1
1460 IF PAGE = P2 THEN M2%(((YI / 2) * 20) + XI) = 1
1470 PC = 0: RETURN
1480 IF PAGE = P1 THEN SW = PEEK (49237): POKE 230,64:PAGE = P2: RETURN
1490 IF PAGE = P2 THEN SW = PEEK (49236): POKE 230,32:PAGE = P1: RETURN
1500 END
1510 REM PICK SUBROUTINE
1520 CP = LM(YI) + PAGE + (XI * 2)
1525 TK = PEEK (- 16336)
1530 FOR I = 1 TO 16 STEP 2:PC(I) = PEEK (CP): POKE CP,0:PC(I + 1) = PEEK
(CP + 1): POKE CP + 1,0:CP = CP + 1024: NEXT I
1600 CP = LM(YI + 1) + PAGE + (XI * 2)
1605 TK = PEEK (- 16336)
1610 FOR I = 17 TO 32 STEP 2:PC(I) = PEEK (CP): POKE CP,0:PC(I + 1) = PEEK
(CP + 1): POKE CP + 1,0:CP = CP + 1024: NEXT I
1680 RETURN
1690 REM DROP SUBROUTINE
1700 CP = LM(YI) + PAGE + (XI * 2)
1705 TK = PEEK (- 16336)
1710 FOR I = 1 TO 16 STEP 2: POKE CP,PC(I): POKE CP + 1,PC(I + 1):CP = CP
+ 1024: NEXT I
1720 CP = LM(YI + 1) + PAGE + (XI * 2)
1725 TK = PEEK (- 16336)
1730 FOR I = 17 TO 32 STEP 2: POKE CP,PC(I): POKE CP + 1,PC(I + 1):CP = C
P + 1024: NEXT I
1740 RETURN

```

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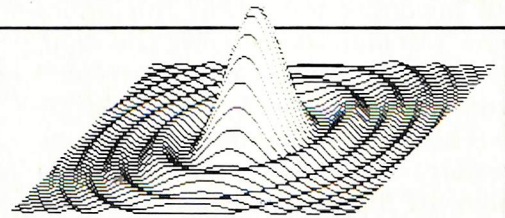
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Using Pascal

on the Apple IIe

Here is a compendium of hints for enjoying the happy combination of Apple Pascal and a IIe.

by Allen Munro

In many ways, the Apple IIe is an ideal Pascal machine. There are several techniques for getting the most out of Apple Pascal 1.1 on the IIe.

The Apple IIe is a better machine than the II Plus for running Apple Pascal. It has at least 64K bytes of memory, the amount required by the Apple Pascal operating system. The IIe readily generates and displays upper- and lowercase text, which makes for more readable source code and comments. And, unlike some 80-column cards used with the Apple II, the IIe 80-column card (installed in the new auxiliary slot) doesn't require changing cables or flipping switches when you want to go from text to graphics mode and back in a Pascal program.

The Apple Pascal operating system is also well-suited to take advantage of the new computer's features. Pascal is happy to take both upper- and lowercase text. If an 80-column card is installed in slot 3, the Pascal operating system on the IIe recognizes its presence at boot time and automatically makes use of it, just as on an Apple II. There is no need for the user to explicitly activate the card by typing PR#3, as in Basic.

The One-Drive Boot Problem

Of course, nothing is perfect, and owners of single-drive Apple IIe systems will find they can't follow the single-drive Pascal boot procedures outlined in the Apple Pascal 1.1 documentation. The owner of an original Apple II or II Plus single-drive system who wants to edit and compile Pascal programs goes through a two-stage

boot, first turning the machine on with the disk called APPLE3: installed, and then putting in APPLE0: (in response to a prompt) and pressing the reset key. That won't work on an Apple IIe, but the loss is not as great as it might seem.

Those who use the system for text editing can boot up Pascal on the IIe just fine with the disk called APPLE1:, which has all the boot files plus the Editor and Filer, along with room for a number of files. This is not a solution for the user who wants to write programs, however, since the file SYSTEM.COMPIILER must be present.

What's the solution to the inability to perform a two-stage boot? Of course, a two(or more)-drive system is the best answer. But don't despair if a second drive doesn't fit in this month's budget. There are two cheaper answers to the dilemma.

The Official Alternate Procedure

A new Apple technical note for dealers suggests that the user create two different versions of the APPLE0: boot disk. In this approach, the user fools the operating system by using two disks with the same name, but sets of files that are only partially overlapping. One APPLE0: disk—the true boot disk—need only have the files SYSTEM.PASCAL, SYSTEM.MISC INFO and SYSTEM.APPLE. Once the boot is complete, SYSTEM.APPLE will not be needed again. Then the user can replace the fake or boot-only version of APPLE0: with a copy of the standard APPLE: disk that permits editing, filing and compiling on one

very crowded disk.

It is very important that SYSTEM.PASCAL and SYSTEM.MISCINFO reside in exactly the same physical location on the two different APPLE0: disks. The easiest way to do this is to make SYSTEM.MISCINFO and SYSTEM.PASCAL the first two files on both.

This brings up a problem with Apple's proposed solution. It never was possible to do much extensive programming with the APPLE0: disk, since it has only 32 free blocks available. This is fine for writing small programs as part of learning the Pascal programming language, but it is not enough for substantial programs. But if you are a beginning Pascal programmer, this approach should suffice for a short while. Ask your dealer for help in configuring the false APPLE0: disk for booting.

The Second Solution

If you want to write, edit, compile and revise larger Pascal programs on a one-drive system, you should consider working with two different boot disks. One is used for editing, the other for compiling. Each time you finish an edit and want to compile, you first use the Filer to transfer the file you've just edited to the compile boot disk. Then you replace the edit disk with the compile disk, reboot, and compile. Table 1 lists some recommended files for the two disks.

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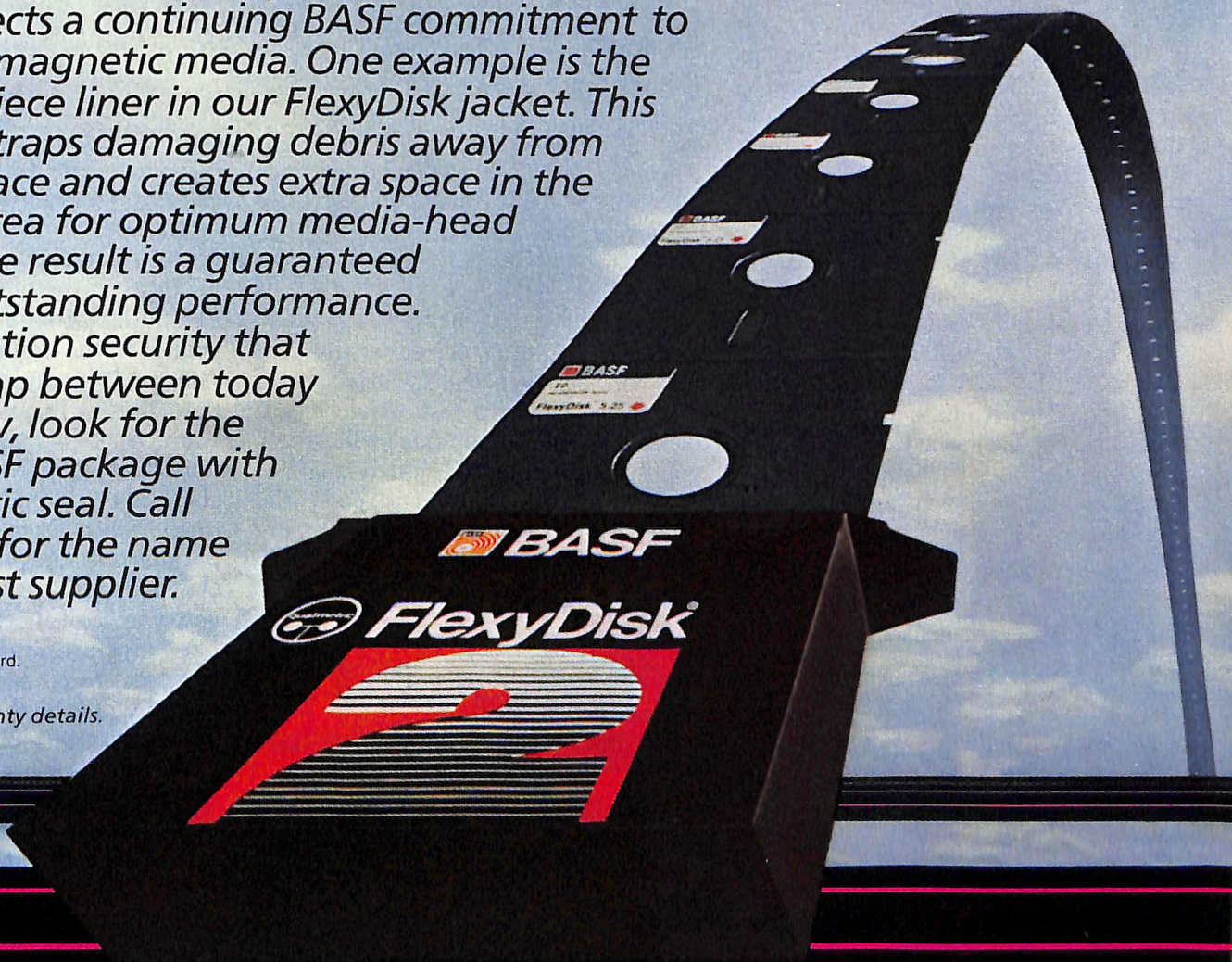
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EDIT:			
SYSTEM.APPLE	32	9-Nov-80	6 Data
SYSTEM.PASCAL	41	22-Sep-80	38 Code
SYSTEM.MISCINFO	1	4-May-79	79 Data
SYSTEM.EDITOR	47	24-Sep-80	80 Code
SYSTEM.FILER	28	18-Sep-80	127 Code
SYSTEM.LIBRARY	34	19-Sep-80	155 Data
< UNUSED >	91		189
6/6 files, 91 unused, 91 in largest			

COMP:			
SYSTEM.APPLE	32	9-Nov-80	6 Data
SYSTEM.PASCAL	41	22-Sep-80	38 Code
SYSTEM.MISCINFO	1	4-May-79	79 Data
SYSTEM.COMPIER	75	19-Sep-80	80 Code
SYSTEM.LIBRARY	34	19-Sep-80	155 Data
SYSTEM.CHARSET	2	14-Jun-79	189 Data
< UNUSED >	89		191
6/6 files, 89 unused, 89 in largest			

Table 1. Recommended files for EDIT: and COMP: boot disks.

The process of progressive program refinement using two such boot disks in turn is not as easy as the conventional approach using the APPLE1: and APPLE2: disks in a two-drive system. One problem with this approach is that certain features of the operating system are not available to the programmer. For example, if the compiler finds a syntax error, you cannot choose E to edit the error, since SYSTEM.EDITOR is not on the disk you booted to compile with. Instead, you must hit the space bar to continue the compilation (or escape to abort it). Just make a note of errors found during compilation, and wait to repair them when you reboot with your edit disk.

SYSTEM.SYNTAX is not included on either EDIT: or COMP: because it is simply a set of compiler error messages that are used when a programmer wants to go directly to the editor from the compiler. Since this can't be done with the two separate boot disks, EDIT: and COMP:, the file can be omitted.

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Use Setup to change SYSTEM.MISCINFO so the up-arrow and down-arrow keys will perform their expected functions. In addition, why not tell the system that the delete key (upper right corner of the Iie keyboard) is the line delete key? To accomplish these changes, begin by booting normally. Then execute APPLE3:SETUP. Your display will appear as in the Figure.

Type C to invoke the Change option. Then a line will ask whether you want to be prompted through the whole set of parameters that can be changed, or whether you will specify them. Since there are a great many parameters and almost all are unchanged, I suggest you select the ones you want to alter. The prompts you must give are listed in Table 2. After you set each new parameter, the system will echo the new value and ask whether you want to change it, so you'll have plenty of opportunity to recover from typos, or whatever.

When you've finished, type Q to quit changing parameters, then D to put the new version on disk. Another Q gets you out of the program. At this point you must use the Filer to replace the file SYSTEM.MISCINFO with NEW.MISCINFO, newly created by the Setup program. We paranoid types usually take a minute longer, first changing SYSTEM.MISCINFO to OLD.MISCINFO, and only then changing NEW.MISCINFO to SYSTEM.MISCINFO. At this point, you can reboot and your arrow keys will work appropriately in the system editor. Give it a try! ■

INITIALIZING

SETUP: C(HANGE T(EACH H(ELP Q(UIT [S.2]

Figure. Initial APPLE3:SETUP display.

HAS LOWER CASE

Change this from false to true.

KEY TO DELETE LINE

Type the delete key.

KEY TO MOVE CURSOR DOWN

Type either the down-arrow key or control-J. (Control-J is the ASCII character generated by the Iie's down-arrow key.)

KEY TO MOVE CURSOR UP

Type the up-arrow key or control-K. (The Iie's up-arrow key generates an ASCII control-K.)

SCREEN WIDTH

Change this to 80 if you have an 80-column card.

Table 2. Parameters that must be changed in revising SYSTEM.MISCINFO.



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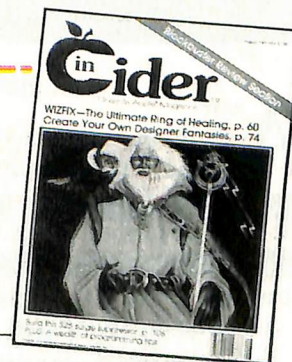
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SETUP: C(HANGE T(EACH H(ELP Q(UIT [S.2]
```

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KEY TO MOVE CURSOR DOWN

Type either the down-arrow key or control by the IIE's down-arrow key.)

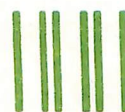
KEY TO MOVE CURSOR UP

Type the up-arrow key or control-K. (The K.)

SCREEN WIDTH

Change this to 80 if you have an 80-column

Table 2. Parameters that must be cha



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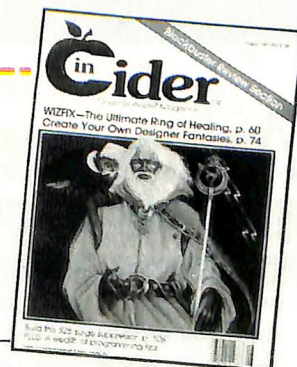
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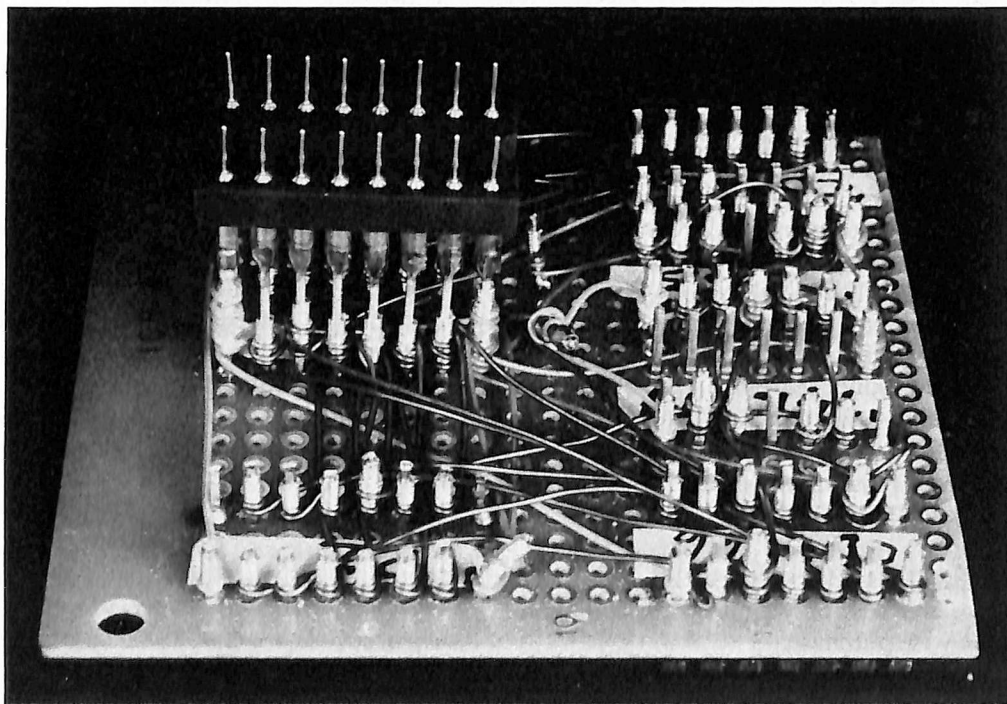
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by Michael B. Corp



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As anyone who has ever mangled a game paddle plug pin can tell you, one of the biggest problems with the Apple's game port is the fact that it only allows one plug in its socket at a time. Also, the I/O socket is located in a very inaccessible place.

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lengthy program to type in! A simple POKE -16292,0 switches to one controller, and a POKE -16291,0 switches you back to the other. And this POKE can be done before entering a game. What could be simpler?

All the hardware for the paddle softswitcher is completely contained on one tiny board. The unit plugs permanently into your Apple game controller socket and forms a piggyback board with two game paddle sockets, which are software-switchable. The two

game controllers can then be permanently plugged into the two sockets mounted on the piggyback board instead of the normal socket.

You can put one of these little jewels together yourself, for about eight or ten dollars' worth of parts. Assembly time is about two hours. If you would rather buy one on a printed-circuit board, they may soon be available in either ready-to-run or kit form.

The home-built version can be wire-wrapped or breadboarded by following the instructions in this article. For those who have not yet tackled a wire-wrap project, this is a perfect undertaking to learn on.

How It Works

The schematic (see Figure 1) is fairly simple, consisting mainly of pin-to-pin connections from the Apple socket to the game-controller sockets. Only four pins on each socket are not "daisy-chain" strings; these are the ones that are switched by the CD4066 (or MC14066) FET switch ICs.

The FET switch IC is a recent development. When turned on it allows a signal to pass through it in either direction. This is done by applying a positive voltage to its control pin to switch it on. A very high resistance exists from input to output when it is off.

The 74LS74 TTL D-type flip-flop

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"If you intend to plug the unit directly into the game-controller socket, be sure to place the parts exactly as shown on the board layout drawing."

determines which FET switches are on. It is set by the AN2 output from the game port. AN2 is an annunciator output, selected high or low by a POKE into memory. If AN2 is set high (more than 2.4 volts) by a POKE -16292,0 in Basic, the clock pulse clocks the Q output of the 74LS74 high and the Q-not output goes low (less than 0.8 volts). This turns one of the FET switches on and the other off, switching the game paddles, or whatever is connected to the GC0-GC3 outputs.

If the AN2 line is set low by a POKE -16291,0 in Basic, the clock pulse causes the flip-flop Q output to go low again, and the Q-not output goes high. This turns the opposite pair of FET switches on, switching the game paddles back again. A 555 timer chip IC supplies a fast clock square-wave to the flip-flop to clock it any time a change in the

AN0 line occurs as a result of the POKE into memory.

The only pins that need to be switched by the FET switches are the GC0, GC1, GC2 and GC3 signals on each of the two new game paddle sockets. These inputs to the game I/O socket come from the potentiometers (variable resistors) contained in the paddles and are part of a timing network as a one-shot timer/flip-flop inside the Apple itself.

This device controls a counter that counts up from zero each time the one-shot goes high, and continues counting as long as the output remains high; when it goes back low, the counter stops. It is this residual count that you PEEK to see where the game paddle is.

Construction Hints

Now, if you intend to plug the unit

directly into the game-controller socket, be sure to place the parts exactly as shown on the board layout drawing (see Figure 2). This is to prevent any interference with the #7 slot connector or any board you might wish to plug into it.

In fact, it's a good idea to use this layout even if you intend to use the board outside the Apple in an enclosure. The board can thus be used either way without modifications.

If you wire-wrap this project you'll need three 16-pin sockets and four 14-pin sockets. There are several ways to identify pin #1 on an IC socket. On some makes, the pin 1 corner is beveled. On others, pin 1 is at the left corner of the end with the dimple. Still others have a very small "bite" taken out of the center at the pin 1 end.

The pins are laid out counter-clock-

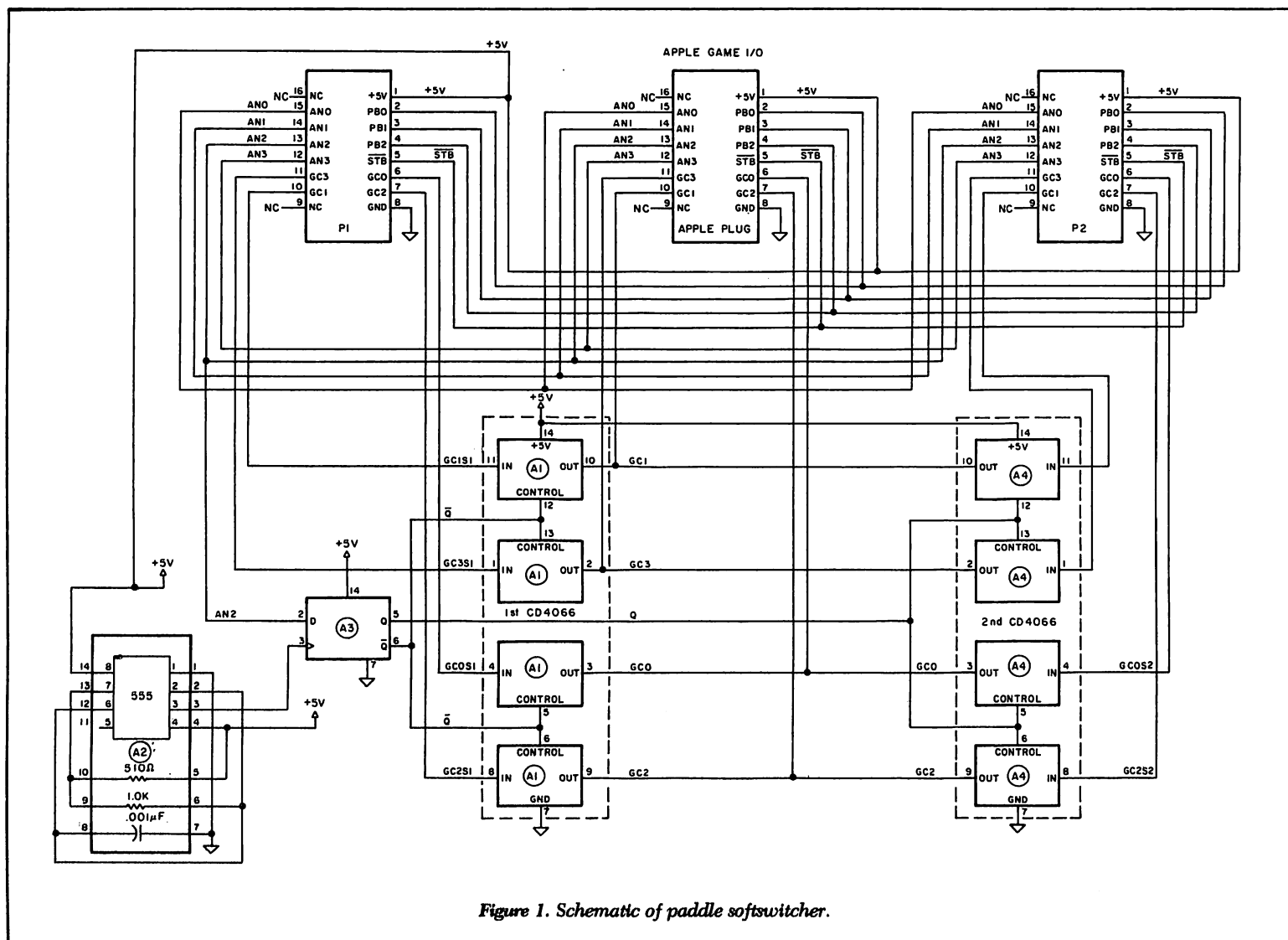
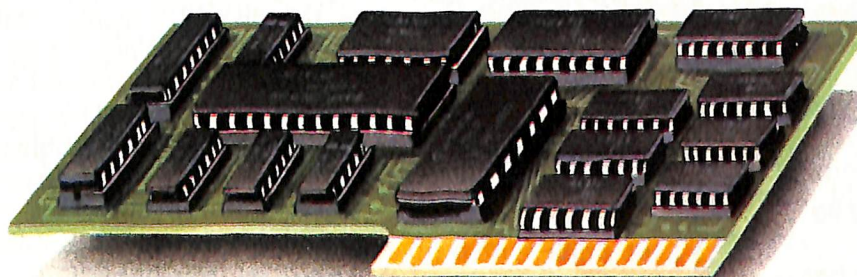
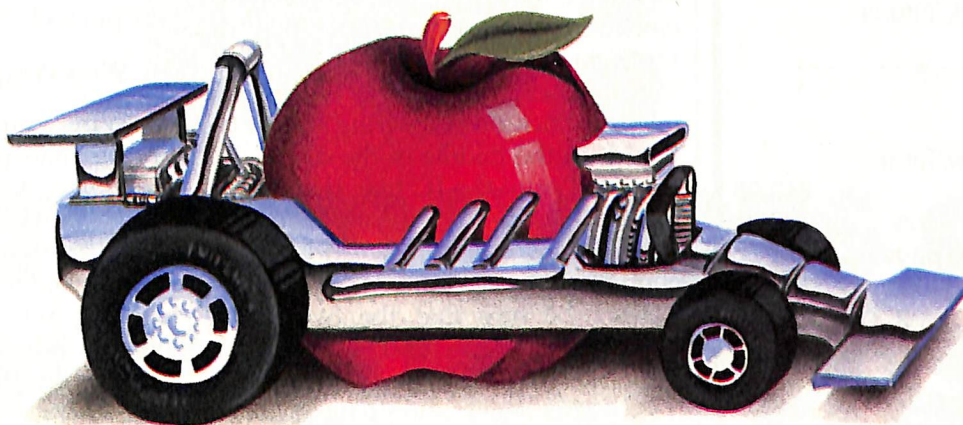
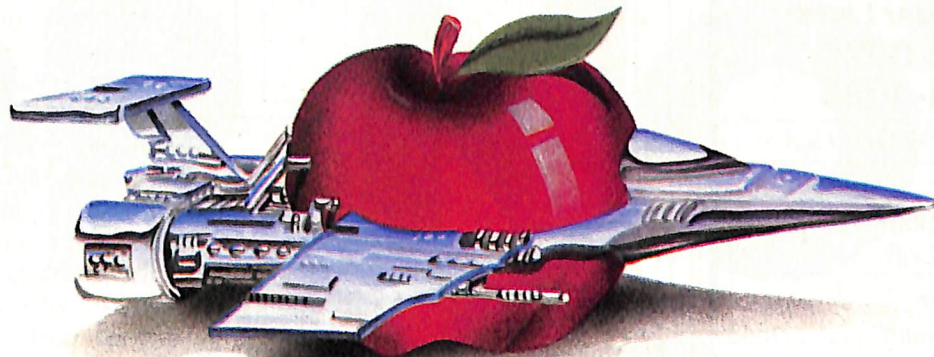


Figure 1. Schematic of paddle softswitcher.

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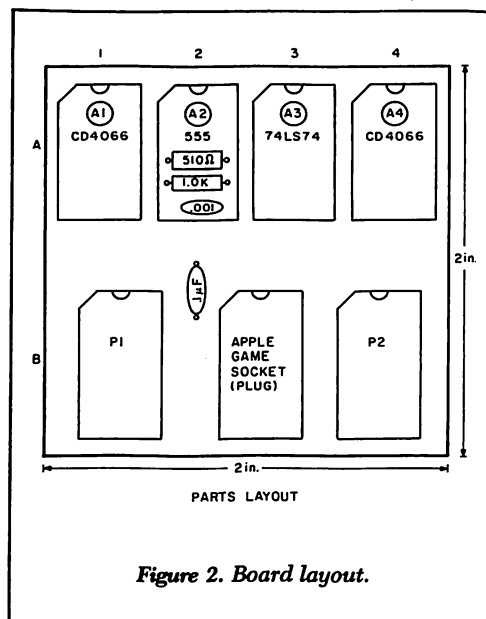


Figure 2. Board layout.

wise from the top (component side) of the socket, starting with pin 1 at the top-left corner. From underneath, however, note that they are counted clockwise, with pin 1 located at the top-right corner.

It is an excellent idea to make small labels to stick on the wiring side of the board, in the middle of the socket. On this label print the IC type that will be installed in that socket, and a number 1 at pin #1...then there will be no confusion.

Also, be sure that the two 16-pin sockets the paddles and joysticks plug into are side by side, not in single file. This is to allow space for the cables to exit the socket area. The end of the socket with pins 8 and 9 on it should be at the bottom edge of the board.

Even if you intend to breadboard this circuit by soldering, the socket that will be the Apple I/O game plug should be a wire-wrap type socket in order to provide the extended legs with which to make your piggyback board—unless you plan to connect it outside the Apple with a ribbon cable.

All pins, except the ones on the 16-pin socket that becomes the plug for the Apple game socket, will be cut as short as possible after wire-wrapping in order to clear the Apple's motherboard. The plug for the Apple game I/O socket will be made by soldering the Augat socket onto the pins of the 16-pin wire-wrap socket, forming an extender plug.

If you plan to use a flat-cable to bring the board itself outside the Apple, it would be wise to mount the board in a small plastic box. Just be sure to leave room for the cables to exit the box, and to mount the board securely in the enclosure.

Also, if you intend to use the unit outside the Apple, you need to be sure to allow plenty of room between sockets for the flat ribbon-cable to come off its socket over the paddle connector cables!

Do not install any parts into the sockets until all the wiring is done! I should point out that the 555 is an 8-pin device, but you will be installing it in a 14-pin socket so that you can use the extra pins at the bottom to install the resistors and capacitor; this will leave wire-wrap pins available for those parts. The 555 pins are numbered 1 to 4 down one side, then 5 to 8 on the other side. But I numbered the pins on the schematic according to 14-pin socket. More on this later.

A Wire-Wrapping Tutorial

Wire-wrapping is used professionally for mass-production as well as prototyping. It requires special wire-wrap sockets that have long, straight, square pins. The success of wire-wrapping depends upon the wire being drawn tightly around the square pins of these sockets. This provides a joint that is enhanced by the corners of the pins biting into the bare wire.

The wire that should be used for wire-wrapping is a thin, springy #30 A.W.G. wire, with "Kovar" (or equivalent) insulation. The wire's springiness causes it to grip tightly as it is wrapped around a pin.

This wire can be obtained at any Radio Shack or electronic parts store. (Ask for #30 A.W.G. wire-wrap wire.) It comes in several colors, which helps in identifying different parts of the circuit.

You will need a pair of good wire-strippers, a pair of diagonal pliers (dikes) and a pair of needle-nosed pliers. You will also need a wire-wrap tool. This can be either the hand tool that sells for under ten dollars, or the more expensive battery-powered wire-wrap gun that automatically turns the barrel to wrap the wire when the trigger is pulled.

I recommend that you start with the cheaper hand tool. This device usually has an unwrapper on the other end. Even if you buy the more expensive wire-wrap gun, you will still need a

Continued on page 108.

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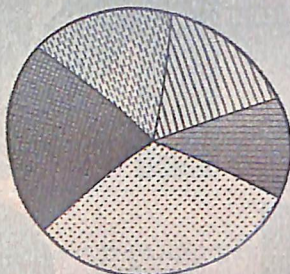
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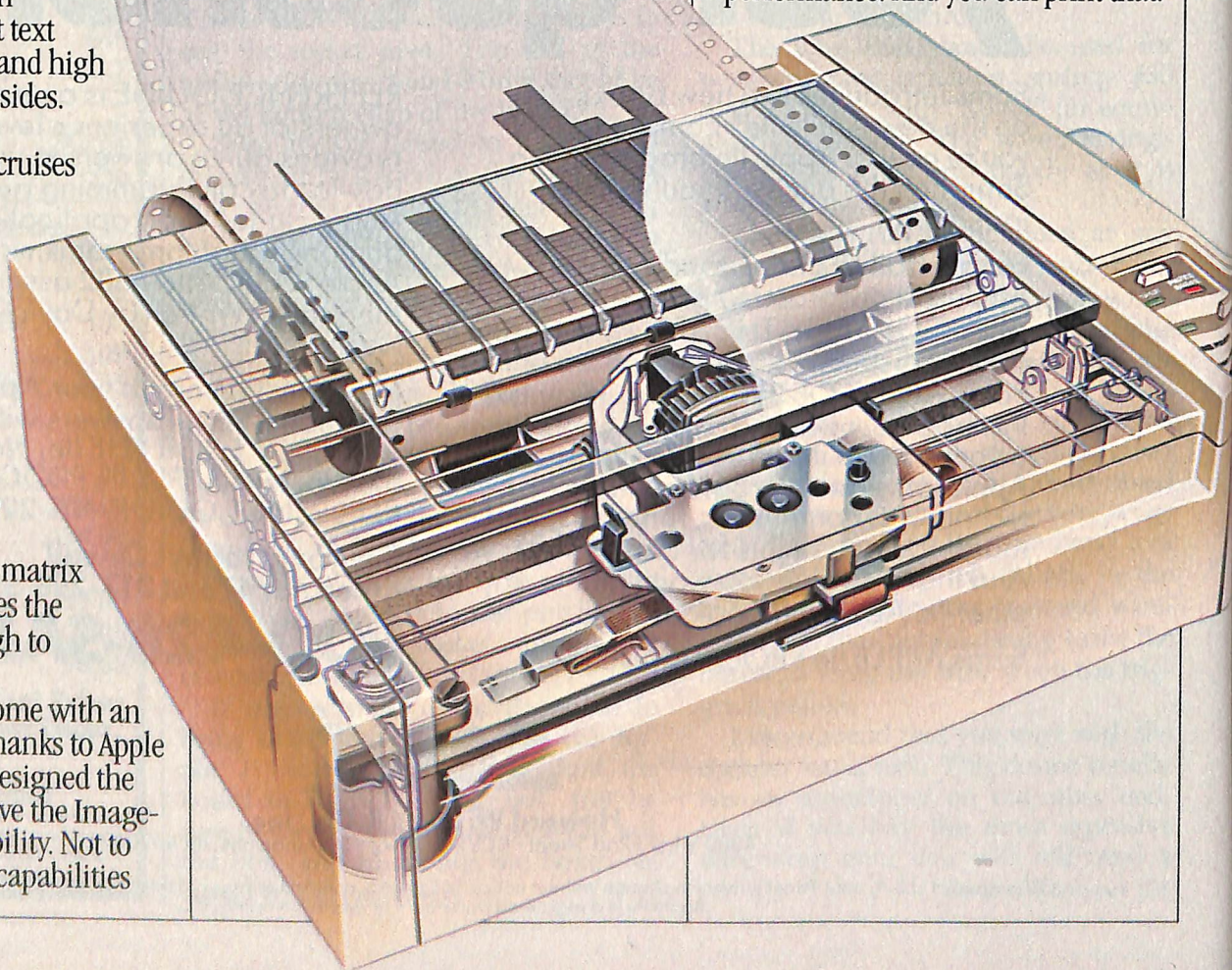
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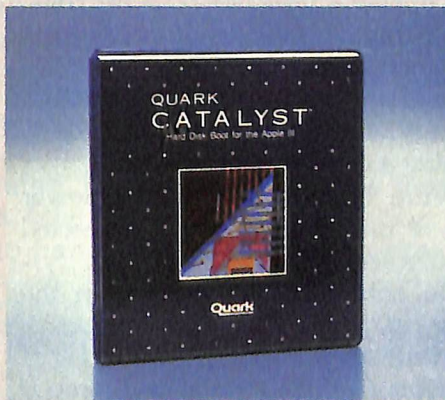
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So if you have an Apple III and a ProFile and more floppies than you care to flip through, get yourself a Catalyst. And boot those disks for good.



"Professionals have found that the easiest way to be sure that every wire ends up on the proper pin in the proper sequence is to use a wire list."

Continued from page 104.

hand tool for unwrapping mistakes.

When stripping the wire, strip back about 1 inch. Squeeze the strippers very gently so as not to nick or cut through the wire. (A nicked wire may break and cause trouble later on.) Pull the strippers gently to the end of the wire, taking the insulation with them.

Insert this end into the wire-wrap tool, making sure that about $\frac{1}{8}$ inch of the insulation enters the barrel of the tool. You'll quickly be able to tell this just by feel.

Starting at the upper-left corner of the schematic, select the pin to be wrapped. Insert it into the barrel of the wire-wrap tool and push the tool down to the bottom of the pin.

Holding the free end of the wire in one hand, wrap the wire around the pin clockwise by either pressing the trigger of the gun or by rotating the hand tool between your fingers. Don't push too hard while wrapping! This causes one big heap of wire at the bottom of the pin and a bad connection.

If you do get any wraps like this, take the unwrapping end of the hand tool, insert it over the pin and unwind the wire off the pin. Then try again.

A good wrap can be identified by a tightly wound spiral with one to three turns of insulation at the very bottom and the last turn tightly against the pin, as shown in the picture. You should not accept any wraps that do not look like this, as they will invariably cause trouble. Be especially sure that you don't have any connections where bare wire is lying outside the pin itself; this will cause shorts and much grief later.

When wrapping strings of connections (where a wire visits one pin, then goes to another, and so on) observe this very good set of rules:

1. Break the string of connections into separate wires between two pins only, forming separate legs of the string.
2. Wrap the first wire at the lower level of the two pins to be connected (the first leg).
3. Do not wrap the next leg in the string yet.
4. Instead, go on to the following leg of the string (if there is one), and wrap it at the bottom of the two pins to be connected in that leg.

5. Then go back and wrap the second level of the two pins in the leg that will join the two halves of the string.

In other words, wire-wrap every other one of the legs on the bottom level first, then go back and connect the strings together on the second level. This is to prevent having a wire from the top level of one pin to the bottom level of the next pin. Otherwise, as you'll discover if you ever make a mistake in the middle of a string, it might be necessary to unwrap an entire string of wires to correct the mistake. Occasionally, there will be no other choice but to connect one end at one level and the other higher or lower, but you should keep these connections to a minimum.

Step-By-Step Construction

Professionals have found that the easiest way to be sure that every wire ends up on the proper pin in the proper sequence is to use a wire list. For your own benefit, you really should make up a wire list for this project. The first column in such a list will be the *wire number*, i.e., the sequence number for that particular wire. The next column will be for the *level* of the wire on that particular pin. The next column should be the *origination pin number* for the first end of that wire. The next column should be the *terminating pin number* for that wire. Next should be columns for the *level of the wrap* at that end, and the *color* of the wire.

Follow the rules for wire-wrapping when making the wire list. List every other wire first, noting that it is on the lower level. Then list the interconnecting links that will tie those legs together, one wire at a time. The wire list should be checked against the schematic before wiring the board, and then each connection checked off as it is made.

I usually install the +5-volt and ground wires first. I use red wire for

+5-volt and black or white for ground. Then the rest of the connections are made with yellow or blue wire, yellow for clock signals and blue for the rest.

As you install each of the wires, check it against the schematic (coloring that wire on the schematic with a yellow felt pen helps). As each connection is made, check it off on the wire list. The level (meaning the first or second layer of wraps on the pin) should also be checked at this point to ensure that it is correct. This is the point at which you can find and correct most mistakes.

As soon as all wires are in place, go back and check each wire from one end to the other, pin for pin, to find any wiring mistakes before continuing. Pay special attention to see that each pin has the wires it should have on it. Use a continuity tester or ohmmeter to check connections. (A simple continuity tester can be made by hooking a battery to a lamp bulb and connecting leads.)

Okay, if you are going to install the board inside the Apple as a piggyback board, solder the Augat socket onto the corresponding pins of the Apple plug (the socket you are using to connect to the Apple), using care to see that pin #1 of both the Augat and wire-wrap sockets are at the same end. When you are sure that every wire is correct, proceed to the next step.

Installation and Final Test

Hold the IC at the ends with thumb and forefinger of one hand. Put one row of pins against a hard surface and press the IC against it with the other hand until the pins are angled at exactly 90 degrees to the IC. Do this for both sides. Try not touch the pins if you can help it. The IC should now go into the socket with a minimum of fuss.

The CD4066s should be installed first. Make sure that there is no static charge between your body and the socket of each CD4066. Do not touch the pins if you can help it and make sure no pins are bent under during installation.

Now install the 74LS74 and 555 ICs. Be sure to get the end with the dimple (or with the bite out of it) with pin 1 at the pin 1 end of the socket! The 510-

"The wire list should be checked against the schematic before wiring the board, and then each connection should be checked off as it is made."

ohm resistor should be plugged into pins 5 and 10 of the socket directly below the 555. The 1000-ohm (1k) resistor is plugged into pins 6 and 9 just below the 510-ohm one. The .001 micro-farad capacitor takes up pins 7 and 8 of the 555 socket.

Next, very carefully plug the board into the Apple game I/O socket, and the two controller plugs into P1 and P2. Be certain that no shorts can occur between the pins of the wire-wrap sockets and the motherboard!

A short program is required to test both the controllers. A listing for this

Basic program is included, if you wish to use it. (See program listing.)

When you are completely satisfied that the wiring is correct, cut the pins on all sockets (except the Apple plug) down to the top of the wire wrapped on the pin; this will clear the motherboard. Cut off the pins of all sockets except the Apple game socket to within 1/16 inch of the wire wrapped around the pin. And that's it!

Now, to switch from one controller to the other, simply type POKE - 16292,0 or POKE - 16291,0 in the immediate mode of Basic. Try it, you'll like it! ■

- 4 each—14-pin wire-wrap sockets
- 3 each—16-pin wire-wrap sockets
- 2 each—CD4066 or MC14066 FET switch ICs
- 1 each—74LS74 dual D-type flip-flop IC
- 1 each—1 3/4-inch-by-2-inch piece of perfboard (wire-wrap board)
- 1 each—Augat or equivalent 16-pin header
- 1 each—.001 µf disk capacitor
- 1 each—2.2k, 1/4-watt resistor
- 1 each—1.0k, 1/4-watt resistor
- 1 each—.01 µf capacitor, for +5-volt filtering

Table. Parts list for the paddle softswitcher. If you prefer to position the board outside your Apple, add one 16-pin-to-16-pin flat-ribbon cable and omit the Augat header.

```

100 HG$ = "PADDLE-SWITCH TEST":WB
    $ = "WRITTEN BY....":MC$ = "
    MICHAEL B. CORP, SR.":AS$ =
    "*"
110 L1 = 20 - ( LEN (HG$) / 2):L2
    = 20 - ( LEN (WB$) / 2):L3 =
    20 - ( LEN (MC$) / 2)
120 TEXT : HOME : VTAB 2: FOR I =
    1 TO 39: PRINT AS$: NEXT : PRINT
    : PRINT
130 PRINT TAB( L1): INVERSE : PRINT
    HG$: NORMAL : PRINT : PRINT
    TAB( L2):WB$: PRINT TAB( L
    3):MC$
140 PRINT : PRINT : FOR I = 1 TO
    39: PRINT AS$: NEXT : PRINT
    : PRINT : POKE 34,10
150 INPUT "WHICH GAME CONTROLLER
    DO YOU WISH TO USE      0 0
    R 1 ?":P
160 IF P = 0 THEN POKE - 16291
    ,0: PRINT "THEN I SHALL POKE
    -16291,0"
170 IF P = 1 THEN POKE - 16292
    ,0: PRINT "THEN I SHALL POKE
    -16292,0"
175 PRINT : PRINT "TO TEST A PAD
    DLE SWITCH, SIMPLY PRESS IT"

180 POKE 34,20
190 FOR I = 1 TO 20: PRINT : NEXT

300 VTAB 20
310 A = PDL (0)
320 C = PEEK ( - 16287)
330 POKE - 16320,0
340 B = PDL (1)
350 D = PEEK ( - 16286)
355 PRINT "PDL 0=";A; + " "
360 PRINT "PDL 1=";B; + " "
370 IF C > 127 THEN PRINT TAB(
    15);"SW0 CLOSED": GOTO 400
380 IF D > 127 THEN PRINT TAB(
    15);"SW1 CLOSED": GOTO 400
390 PRINT TAB( 15);"
    ": GOTO 300
400 GOTO 300

```

Program listing. Short program for testing controllers.

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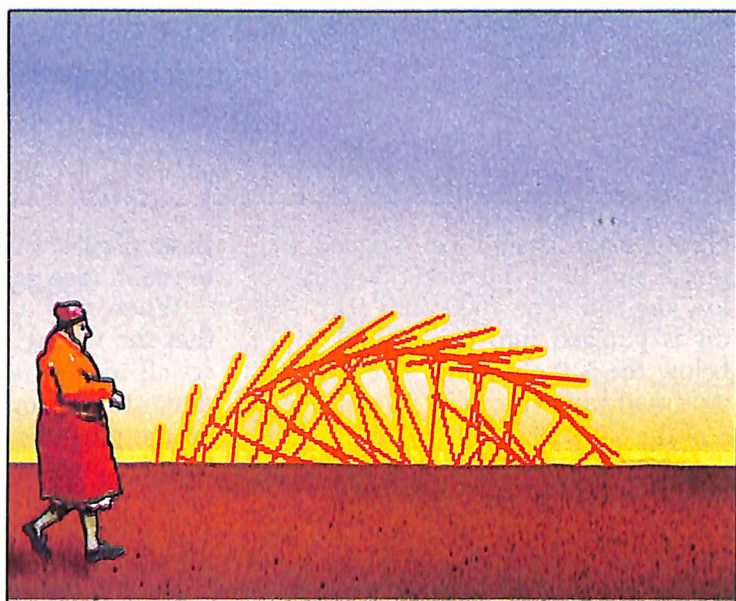
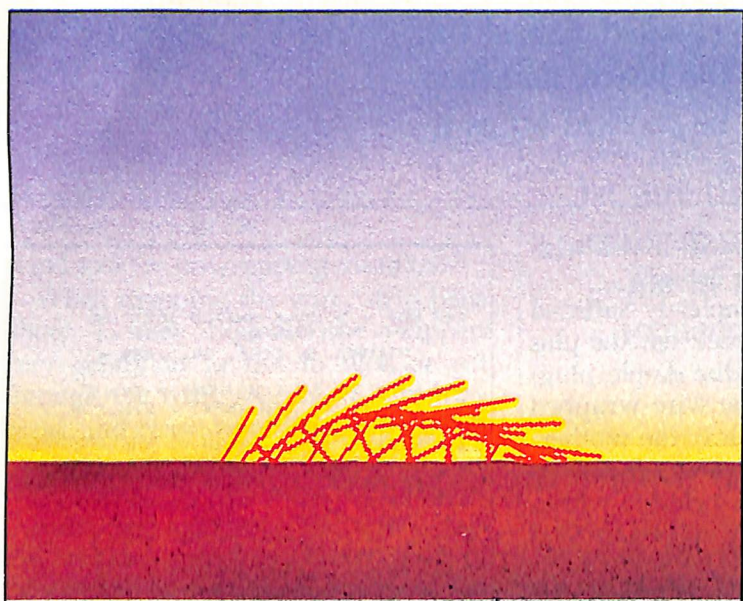
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Logo Building Blocks

by Molly Watt

Joey discovers that programming in Logo can be child's play.

All children draw, and when Joey sat down to use Logo on my Apple, it was to draw. In his short lifetime he had drawn with magic markers on paper, sticks in the sand and now he was using this electronic etch-a-sketch to talk to a metaphoric turtle dragging a pen across a graphics screen. The activity was a natural one for him. He knew how to draw and he liked to draw. The first word he typed was DRAW to tell the computer he was ready and wanted a clear screen.

Joey drew in direct mode. He experimented with lines and turtle steps, sending the turtle wrapping around the screen, stepping over to the corner, crossing and recrossing lines. Sometimes the turtle surprised him by turning the opposite direction he thought it would turn—turning to the turtle's *right*, not Joey's *right*. Or seeing the turtle end in the same place with FORWARD 30 as with FORWARD 270 because it had *wrapped* around the screen.

Eventually Joey began to draw intentionally. Since his name starts with a J, he drew a J on the screen. After a good deal of trial and error, he finally finished it (Figure 1) to his satisfaction and delight. He asked, "Can I save this?" Yes, there was a way to save the J. First, he needed to remember how he made it. He collected his thoughts,

and recreated it with much trying and revising and help from me (Listing 1). He named this set of instructions J and we entered the edit mode to teach the computer how to "J". Thus had he written his first program and created one Logo building block, a procedure named J.

J6 and J. SNAIL

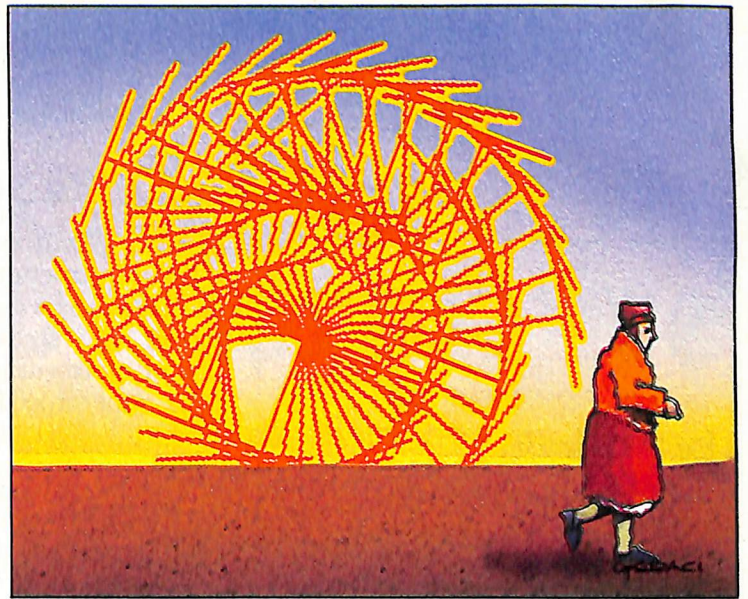
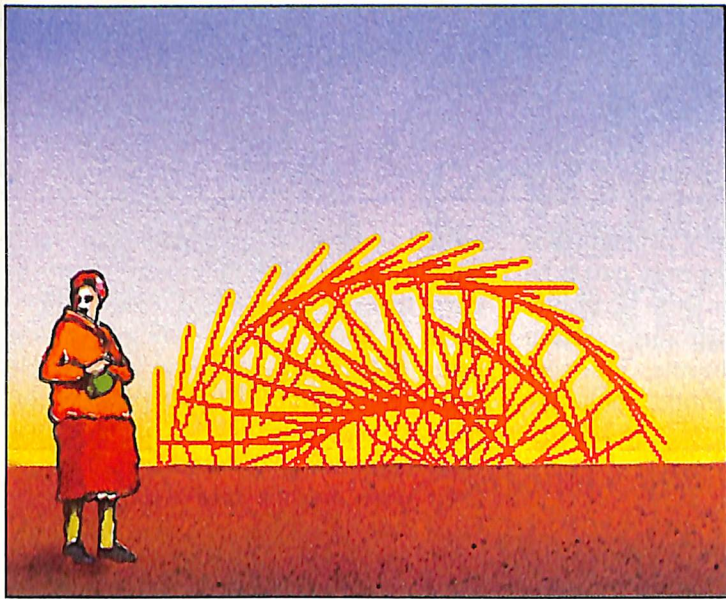
After defining J, Joey played with it for a while by typing J over and over again. He liked the design he got by typing the letter six times, and so he created a new Logo procedure, J6 (Listing 2), which puts six Js on the screen in a sort of mandala (Figure 2). By playing with his superprocedure J6 and keyboarding a turn after each command, he had a picture (Figure 3) that reminded him of a snail. He wrote his third procedure to create his J snail (Listing 3). I assisted him in all his work by watching where his interests took him and giving him the commands he needed to meet his evolving goals.

When he was ready to quit for the day, I showed him how to save his workspace on a disk. This workspace contained the three procedures he had taught the computer how to do—J, J6, J.SNAIL. Then we typed GOODBYE to clear the workspace. Joey summed up his experience by saying, "Now I know the computer's just a dumb machine; it can only do what I teach it!"

The Learning Process

Joey had begun a learning process that can continue indefinitely. He used the computer as another tool for expressing himself and his ideas. Joey expressed his thoughts in two forms—first, by drawing a picture he wanted and later in writing a procedure. In charge at all times, he had the powerful experience of controlling the turtle and telling it what he wanted it to do. He learned to save his instructions in procedural form, and to repeat the procedure by simply typing the name he had given to his own list of instructions. He found that he

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could easily use his procedure to create something different—J became the building block for J6, and later J6 became the building block for J.SNAIL. Joey learned a number of specific commands. Some problem solving and debugging techniques, which many feel are the most transferable to real life situations, were explored.

In addition, Joey learned something about his own thinking process by actually translating his thoughts into a form he could look at, and identify his own misconceptions about what would happen. He found that spelling matters. And by being in charge of making something happen on the computer, he may have developed some self-confidence.

Joey is not mystified by the Apple or in awe of computers. It is an ordinary part of his growing-up experience. He knows some things it can do. He feels comfortable using it, and is intrigued by its possibilities.

When Joey returns to the computer, he can recall J, J6, and J. SNAIL from his saved disk. He can play with them by typing their names, and he can continue to work to change them, if he chooses. He is in charge of his own directions and may go off on an entirely new exploration.

Other Possibilities

If he stays with his J, what is possi-

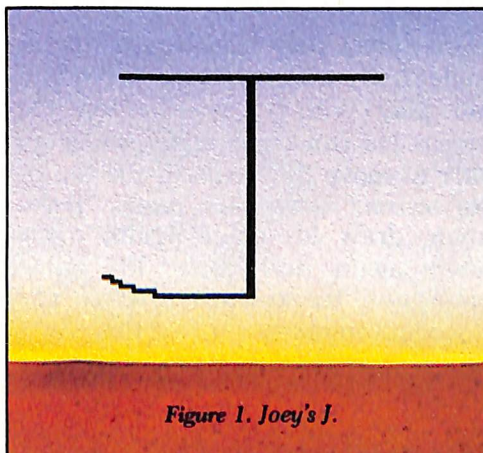


Figure 1. Joey's J.



Figure 2. J6 printed from the graphics screen.

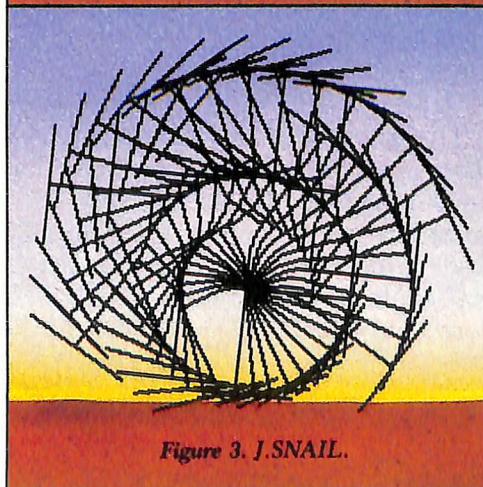


Figure 3. J.SNAIL.

ble? He might decide to create a new superprocedure to write his name. He can define the procedure by simply understanding what he wants it to do and typing his plan in the edit mode:

TO JOEY

J

O

E

Y

END

With the superprocedure defined, he could type the command JOEY. The turtle will then follow his directions, going as far as it can go. It will draw a J because it knows how to J. Then it will stop and print:

There is no procedure named O in line 2 of level 1 of JOEY

Joey will then know what to work on: figuring out how to draw an O with the turtle, and then teaching the computer how he did it. By working through his name in this way, he will learn how to break a larger problem into the "mind-sized bites" Seymour Papert writes about in *Mindstorms*. This skill will be indispensable in Joey's future dealings with the turtle.

Continuing to work with the JOEY procedure, Joey might become dissatisfied with the same size always being drawn on the screen. By editing the name to create a second JOEY procedure and varying the size, he will tap into one of the most powerful aspects

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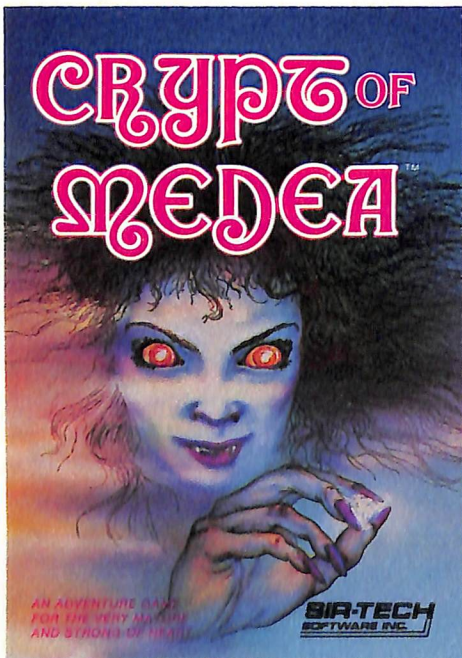
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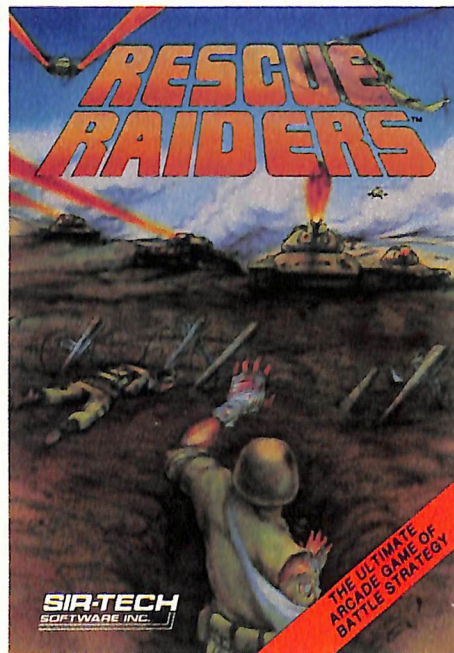
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In Search of . . . Basic Keywords

Imminent insanity launched the author on a late-night hunt for a hybrid utility. His solution just may help you.

by Anthony Claiborne

Driven raving mad late one evening by a recalcitrant RETURN WITHOUT GOSUB error message in a long and rambling program, it occurred to me that I had two choices: either check in at the nearest sanitarium or check every GOSUB, RETURN and POP in the program. This utility program grew out of my desire to stay out of a straight jacket.

What I needed was a way to find particular Basic words—the “keywords” of the Basic programming language—in a program. The Applesoft keywords are listed on page 122 of the *Applesoft Basic Programming Reference Manual*.

Many utility programs used for Applesoft program cross-referencing (such as &XREF in the *Applesoft Programmer's Assistant*) don't even reference basic keywords in a program. Others will print out a list containing every keyword in the program and the line numbers on which each keyword occurs—in my case this would have meant about fifty screen loads. Yet others require the program in question to be saved to disk prior to cross-referencing and reloaded each time you want to edit afterwards.

It seemed that none of the above utilities would help me and so, like any hacker worthy of the name, I wrote my own utility.

The first and foremost thing I wanted it to be was co-resident—in other

```

10 REM EXECUTIVE TEXT FILE MAKER
20 REM REQUIRED TO RUN KEYWORD
30 REM SEARCH UTILITY.
100 D$ = CHR$(4)
110 PRINT D$;"OPEN SEARCH"
120 PRINT D$;"WRITE SEARCH"
125 REM SAVE BASIC POINTERS
130 PRINT "POKE 48351,(PEEK(103))"
140 PRINT "POKE 48352,(PEEK(104))"
145 REM RESET POINTERS TO 16385
150 PRINT "POKE 104,64"
160 PRINT "POKE 103,1"
170 PRINT "POKE 16384,0"
180 PRINT "LOAD SEARCHPRG"
190 PRINT "RUN"
200 PRINT D$;"CLOSE SEARCH"
210 END

```

Listing 1. Make exec file Search.

words, resident in the computer at the same time as the program I was referencing. I wanted to call the utility while I was editing my program, and to edit again as soon as I'd finished with the utility. Not having a lot of time, I also wanted to write the utility in Basic.

Since most of my Applesoft programs, and I suspect most of yours too, reside below the high-resolution pages, I decided to have my utility reside and run above high-resolution page 1 (see memory maps on pages 126 and 127 in the *Applesoft Basic Programming Reference Manual*).

Now, Applesoft looks for the starting address to load a program at locations 103 and 104 (\$67 and \$68 for you hex freaks). The starting address stored in these two bytes is in the standard 6502 format, low byte first. In addition, Applesoft requires that the byte preceding the program starting address hold a zero. To load a program starting at any legal location, you perform the following steps:

1. POKE 103, location - 256 * int(location/256)
2. POKE 104, int(location/256)
3. POKE location - 1,0

A load command places the program at the location specified (assuming you don't try to load it on top of ROM or something else crazy).

Similarly, to find the location where the current Basic program resides in memory, you reverse the first two steps above:

1. low byte = PEEK(103)
 2. high byte = PEEK(104)
- and so location = 256 * high byte + low byte.

Now the procedure for running the utility was shaping up. I would exec a text file which would save the program starting address in some safe place, set the program starting address pointers above hi-res page 1, and then load and run my utility program. After the utility program had finished its task, it would reset the program starting address pointers to point to the starting

Address correspondence to Anthony Claiborne, 318 Homeland N.W., Albuquerque, NM 87114.

Listing 2.
SEARCHPROG.

```

10 REM SEARCH FOR KEYWORD UTILITY
20 REM BY ANTHONY CLAIBORNE
30 REM 318 HOMELAND NW
40 REM ALBUQUERQUE, NM 87114
50 REM *****
60 REM * THIS PROGRAM MUST BE
70 REM * LOADED @ 16385 BY AN EXEC FILE
80 REM *
90 REM * RESIDENT PROGRAM MUST BE
92 REM * SOMEPLACE ELSE.
95 REM *****
100 TEXT : HOME : NORMAL : DIM T$(107),L(500),A(107),BUFF(255)
110 VTAB 1: HTAB 10: PRINT "SEARCH FOR KEYWORDS": POKE 34,3
120 VTAB 12: HTAB 12: PRINT "LOADING KEYWORDS."
130 GOSUB 820
140 VTAB 12: HTAB 12: PRINT SPC( 17);
150 VTAB 3: HTAB 1
160 PRINT : INPUT "KEYWORD: ";K$
165 REM FIND KEYWORD INDEX
170 K = 0
180 K = K + 1
190 IF K$ = T$(K) THEN 340
200 IF K < 107 THEN 180
210 PRINT : PRINT K$;" IS NOT A BASIC KEYWORD."
220 PRINT "EXAMINE LIST OF KEYWORDS (Y/N)?": POKE - 16368,0:
GET X$: IF (X$ < "Y") AND (X$ < "N") THEN 220
230 PRINT
240 IF X$ = "N" THEN 160
250 HOME
260 FOR I = 1 TO 103 STEP 3
270 PRINT T$(I); TAB( 13);T$(I + 1); TAB( 27);T$(I + 2)
280 IF (I / 55) < 1 THEN INT (I / 55) THEN 310
290 PRINT
300 VTAB 23: HTAB 6: INPUT "PRESS (RETURN) TO CONTINUE.":X$: HOME

310 NEXT I
320 PRINT T$(107)
330 GOTO 160
340 HOME : VTAB 2: HTAB (30 - LEN (T$(K))) / 2: PRINT "KEYWORD =
";T$(K)
345 REM ADD 127 FOR KEYWORD TOKEN
350 AA = K + 127
360 PRINT : INPUT "SEARCH FROM LINE #:";QL$
370 QL = VAL (QL$)
380 IF (QL < 0) OR (QL > 65535) THEN 360
390 INPUT "TO LINE #:";QH$
400 QH = VAL (QH$)
410 IF (QH < 0) OR (QH > 65535) THEN 390
420 IF QH = 0 THEN QH = 65535
430 HOME
432 REM *****
434 REM * MAIN PROGRAM
436 REM RESIDENT PROGRAM LOCATION
438 REM HELD IN 48351 & 48352
440 LOC = PEEK (48351) + 256 * PEEK (48352)
442 REM FIRST TWO BYTES OF LINE
444 REM ARE NEXT LINE POINTER
450 GOSUB 640:NL = Q: GOSUB 640:NL = NL + 256 * Q
452 REM IF WE FOUND KEYWORD IN
454 REM LAST LINE, PRINT BUFFER
460 IF F = 1 THEN GOSUB 650
462 REM IF NEXT LINE POINTER ZERO
464 REM THEN END PROGRAM
470 IF NL = 0 THEN 580
480 HTAB 1: FLASH : PRINT "SEARCHING": NORMAL : F = 0
482 REM NEXT TWO BYTES OF LINE
484 REM ARE BASIC LINE NUMBER
490 GOSUB 640:L = Q:BUFF(1) = L: GOSUB 640:BUFF(2) = Q:L = Q *
256 + L
495 REM * TEST TO SEE IF QL(=L(=QH
500 IF L < QL THEN LOC = NL: GOTO 450
510 IF L > QH THEN 580
520 K9 = 3
522 REM * FILL BUFFER FROM BYTE
524 REM * 3 TO END OF LINE.
526 REM * LINE ENDS AT BYTE=0.
530 GOSUB 640:A = Q:BUFF(K9) = Q: IF A = 0 THEN LOC = NL: GOTO
450
540 K9 = K9 + 1
542 REM * TEST TO SEE IF BYTE
544 REM * IS OUR KEYWORD TOKEN.
550 IF (A < ) AA) THEN 530
552 REM * IF BYTE IS KEYWORD
554 REM * TOKEN THEN FOUND=1.
560 F = 1:F9 = 1
570 GOTO 530
580 IF F9 = 1 THEN 600
590 HTAB 1: PRINT "NO OCCURENCES FOUND"
600 REM NO MORE LINES
605 REM RESET TEXT WINDOW
610 POKE 34,0
615 REM RESET PROGRAM POINTERS
620 POKE 103, PEEK (48351): POKE 104, PEEK (48352): POKE ( PEEK
(48351) + 256 * PEEK (48352)) - 1,0
630 HTAB 1: PRINT SPC( 10): PRINT : END
632 REM *****
634 REM * SUBROUTINE TO GET BYTE
636 REM * FROM LINE & PUT IN Q.

```

Listing continued.

address of my original program.

The problem of finding a safe place to store the program starting address pointers could have been thorny. Bear in mind that when the exec file loads and runs the utility program, anything which is in user memory prior to the load is normally lost.

Fortunately, there is a solution to this type of problem and it has been useful to me in any number of situations. It turns out that DOS, which necessarily resides above HIMEM: is similar to Swiss cheese in that there are little places that are unused. Poking values into these little places is safe, because unless the DOS is rebooted or clobbered, they will be above HIMEM:. My particular favorite hole in the cheese starts at location 48351.

Now I had a procedure to use the utility. All that remained was to figure out how the utility was to work. For that you need to know how Applesoft programs are stored in memory.

The first two bytes of a program line hold (6502 format again) the location in memory of the next program line. If both bytes are zero, then you look at the last line in the program.

The third and fourth bytes of a program line hold the number of the program line under consideration. This again is in 6502 format, low byte first (makes you wish you had eight fingers on each hand sometimes).

Subsequent bytes of a program line hold either ASCII code, Basic keyword tokens, or a zero. A byte with zero in it is the last byte in the program line.

The Basic keyword tokens are a way that Applesoft and other interpreters save space requirements for a Basic program. There are 107 Basic keywords, and their tokens go from 128 to 234 (see page 121 in the *Applesoft Basic Programming Reference Manual*). The computer stores just one byte, the token, for each keyword in the program.

The ASCII data in program lines is the standard Applesoft ASCII character code representing a character in the program as a number from 1 to 95.

Armed with this wealth of information about Applesoft and DOS, I was ready to proceed.

Listing 1 is a program that creates

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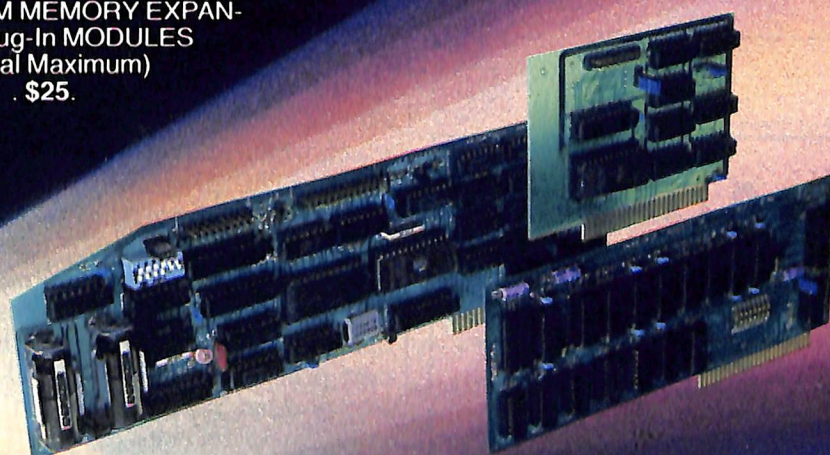
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an executive text file named Search which saves the program starting address pointers in your favorite location, resets the pointers above hi-res page 1, then loads and runs the utility program.

The utility program itself is named and saved on disk as Searchprog (Listing 2).

After clearing the screen and general housekeeping, the first thing the program does is fill an array, T\$, with the Basic keywords at line 130 where subroutine 820 is called. Being lazy, I didn't want to type all those keywords into data statements. Applesoft in ROM has a list of keywords (and in order, too!) starting at location 53456. Now somewhere in ROM there is an index to these keywords, but instead of searching through ROM for that index (did I mention that I'm lazy?) I have an array, A, which has the length of each keyword in order. Using this information, it's easy to fill T\$ from the ROM list.

Next the program asks for the keyword you want and verifies that it is, in fact, a keyword. If not, you have the option of seeing all the keywords and trying again. This can be helpful—note, for example, that SPC(is a keyword and SPC is not. The token number in variable AA is the keyword

Listing continued.

```
638 REM * INCREMENTS BYTE POINTER
640 Q = PEEK (LOC):LOC = LOC + 1: RETURN
642 REM *****
644 REM * PRINT BUFFER ROUTINE
646 REM FIRST PRINT BASIC
648 REM LINE NUMBER.
650 HTAB 1
660 PRINT BUFF(1) + 256 * BUFF(2);" ";
670 K9 = 3
675 REM TEST FOR END OF LINE
680 IF BUFF(K9) = 0 THEN 750
682 REM IF NOT TOKEN, THEN
684 REM PRINT ASCII.
690 IF BUFF(K9) < 128 THEN PRINT CHR$ (BUFF(K9));: GOTO 730
692 REM IF TOKEN, TEST TO SEE
694 REM IF IT'S OUR TOKEN -
696 REM INVERSE IF YES.
700 IF (BUFF(K9) = AA) THEN INVERSE
705 REM PRINT KEYWORD
710 A = BUFF(K9) - 127: PRINT " ";T$(A);" ";
720 NORMAL
730 K9 = K9 + 1
740 GOTO 680
750 PRINT
760 PRINT
770 PRINT "FIND NEXT ONE (Y/N)?";
780 POKE - 16368,0: GET X$: IF (X$ < ) "Y") * (X$ < ) "N")
THEN 780
790 IF X$ = "N" THEN POP : GOTO 580
800 HTAB 1: PRINT TAB( 39);"";: HTAB 1
810 RETURN
812 REM *****
814 REM * FILL ARRAY T$ FROM
816 REM * ROM KEYWORD TABLE
820 FOR I = 1 TO 107: READ A(I): NEXT I
830 START = 53456
840 FOR K = 1 TO 107
850 FOR I = 1 TO A(K)
860 IF PEEK (START) > 90 THEN Q9 = PEEK (START) - 128: GOTO 880
870 Q9 = PEEK (START)
880 T$(K) = T$(K) + CHR$ (Q9)
890 START = START + 1
900 NEXT I
910 NEXT K
920 RETURN
925 REM * LENGTHS OF KEYWORDS
930 DATA 3,3,4,4,5,3,3,4,2,4,3,3,4,4,4,4,3,7,5,
4,5,4,4,4,6,6,5,7,6,7,5,6,3,4,6
940 DATA 6,5,6,6,5,6,3,4,3,2,7,1,5,6,3,4,2,4,4,4,
3,4,5,4,4,5,3,3,4,2,2,4,4,2,3,4
950 DATA 1,1,1,1,1,3,2,1,1,1,3,3,3,3,5,3,3,3,3,
3,3,3,3,3,4,3,4,3,3,4,5,6,4
```

index plus 127.

You are then asked for a line number to start the search. Just press return if you want to search from the beginning of the program. Next you are asked for the last line number for the search. Press return if you want to search to the end of the program.

The main program begins at line 440, where the program starting address is calculated. Using subroutine 640 that reads one byte at a time, each program line is examined to see if its line number is below range, then the next program line is examined. If the line number is above range, then the utility program exits.

If the program line number is in the range specified, the line, from the third byte to the end, is dumped into a buffer, BUFF. The program line is also examined byte by byte for a match to the token for the keyword. If a match is not found, the next program line is considered. If there is no program line following, then it exits the utility.

If there is a match, however, the subroutine beginning at line 650 prints

the program line from the bytes stored in BUFF. Keywords are printed by using the token number to find the appropriate element of T\$. If a keyword is the one being sought, it is printed in inverse. After the program line is printed, you may choose to continue the search or exit the utility.

If there are no occurrences of the keyword in the specified line range, then the utility says so and exits. Exiting occurs at line 630, where the program starting line pointers are reset.

To use the program, have the disk that has the text file Search and the program Searchprog in the disk drive. Type EXEC SEARCH. On exiting the search program, you should have the program you were working on still in memory for listing, editing, and so forth.

So once more I have narrowly missed a trip to the place with soft walls. However, I'm working on an assembly-language version which does the above and also searches for ASCII strings. If that doesn't drive me crazy, I'm more hard-headed than I thought. ■

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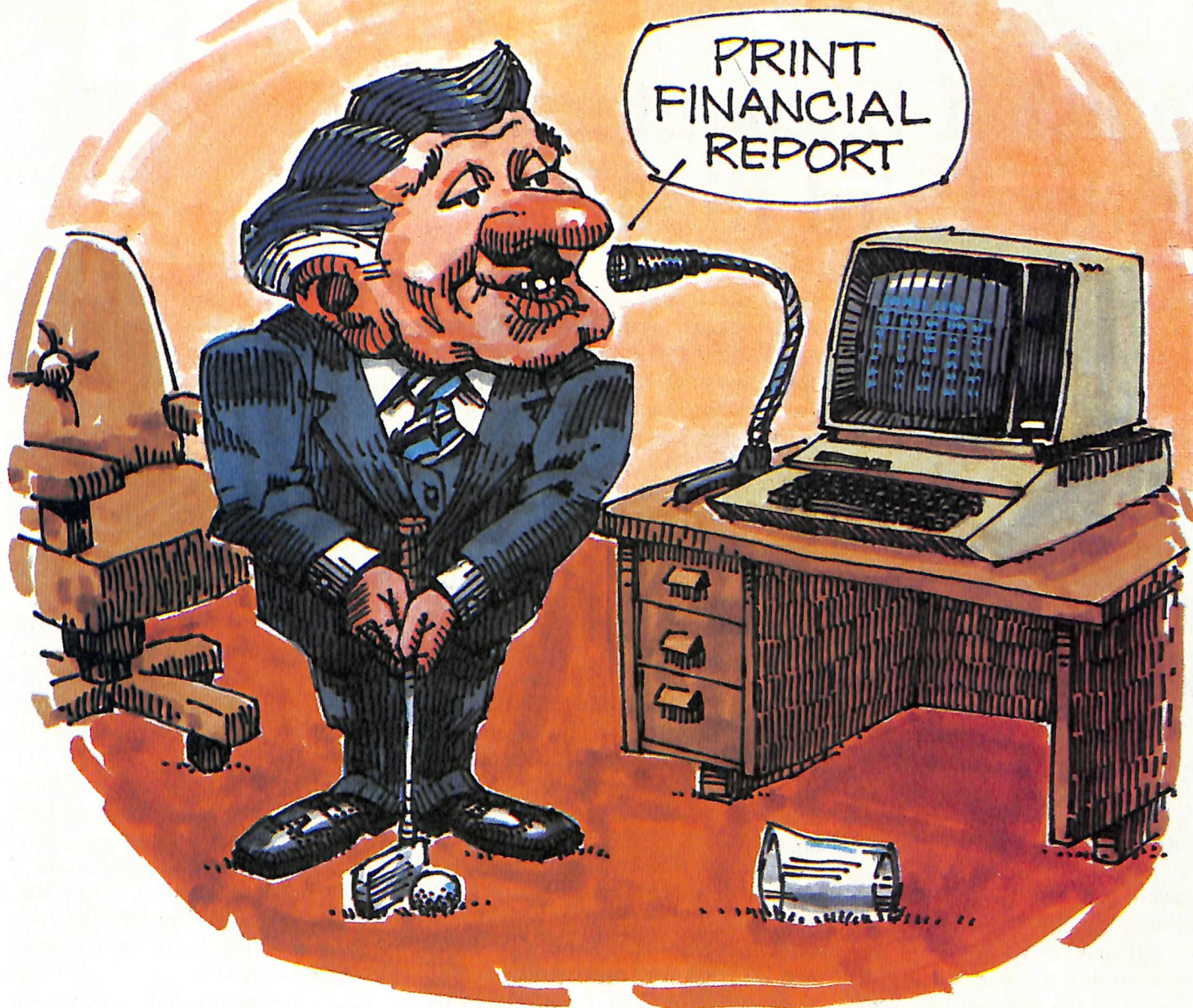


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Fudge It!

by Don Fudge

Collision Encounters Of the Third Kind

In keeping with my promise to inform my readers about both Apple graphics as they are now and Apple graphics as they are transforming and evolving, I shall this month survey the fascinating subject of collision counters and collision detection in general.

What is a collision? It is an event in which two elements of a hi-res (usually) display are at least slightly superimposed, so that at least one pixel of one of the elements (shape, sprite or background) has the identical hi-res coordinates as a pixel of a different hi-res element. What happens then?

First, an historical perspective. I remember that soon after getting my Apple (several years ago) I ran across the zero page usage table in the Applesoft manual. Among its listings was something at \$EA called the "collision counter." I did not understand the function of this flag, so I ended up on the Apple Hot Line. No one there had the slightest idea what the terms meant or what one might do with this "counter." A few months later, I was talking with a friend of mine, Doug Carlston, now head of Broderbund Software. He had an idea of what to do with it, but no exact notion of how or why it worked.

DRAW and XDRAW

I listed through the machine language monitor disassembly codes with the monitor L command. I remember being delighted to eventually find \$EA as one of the hexadecimal addresses used in XDRAW and DRAW algorithms. It seems that Applesoft uses DRAW and XDRAW in such a way that \$EA is incremented when a

shape dot that is on is superimposed on a background dot that is off, using XDRAW. By the same token, when a shape dot that is on is superimposed on a background dot that is on, \$EA is not incremented.

DRAW is the opposite. When a shape dot that is on is superimposed on a background dot that is off, \$EA is not incremented. But when a shape dot that is on is superimposed on a background dot that is on, \$EA is incremented. \$EA's value is decimal 234, so PEEKing into this location allows you to detect collisions between background and vector shapes or between separate vector shapes.

What do you look for in collision detection? What numbers found (in PEEKing into 234) mean what? Let's investigate.

Type in DEMO (Listing 1) and save it as DEMO. Make sure POKE 104,64 and POKE 16384,0 appear in your Hello program that boots before you run DEMO. And make sure you type in at least lines \$930 to \$96D of MAN (Listing 2), which you will BSAVE as MAN with address \$930 and length \$14A. This creates a sequence of "lit-

tle men" shapes that you can make walk using XDRAW for both drawing and erasing. See Figure 1 for the steps of the walking procedure.

If you type only up to \$96D, you can DRAW or XDRAW only one shape. That will work fine for the DEMO, but will not support walking animation (to be discussed in a later column).

The DEMO

Type RUN (if POKE 104,64 and POKE 16384,0 have already been done and DEMO has been loaded or typed into memory) and hit return. Then grab your game paddles, joystick or Koala pad.

A couple of little people should appear on the screen. If not, turn both knobs 90 percent of the way counter-clockwise and hit the space bar. If this doesn't work, run it again after control-reset. All we are trying to do is get your little person within legal (Y<192) coordinates.

Once you've "created" a person by hitting the space bar and moving the paddle, notice the five numbers at the bottom of the screen. The first line contains the last person's X and Y coordinates. The last line contains the most recent person's X and Y coordinates. The number in the center between X coordinates is the result of the PEEK (234).

You are in DRAW mode now. Notice that when you move to a totally vacant spot, the collision counter (234) contains zero. When you DRAW a person precisely on top of a previous person (by hitting the space bar again

```
3 TEXT : HOME : VTAB 1: INVERSE :  
  PRINT "COLLISION COUNTER DEM  
  O": NORMAL : PRINT  
5 PRINT CHR$(4); "BLODMAN"  
10 HGR : ROT= 64: SCALE= 1: HCOLOR=  
  3: POKE 232,48: POKE 233,9  
15 HOME : VTAB 21: PRINT PEEK (2  
  34)  
18 DRAW 1 AT 20,20  
19 P0 = PDL (0): FOR QW = 1 TO 10  
  : NEXT :P1 = PDL (1)  
20 DRAW 1 AT P0,P1  
25 PRINT PEEK (234)  
28 PRINT P0,P1  
30 GET A$: GOTO 19
```

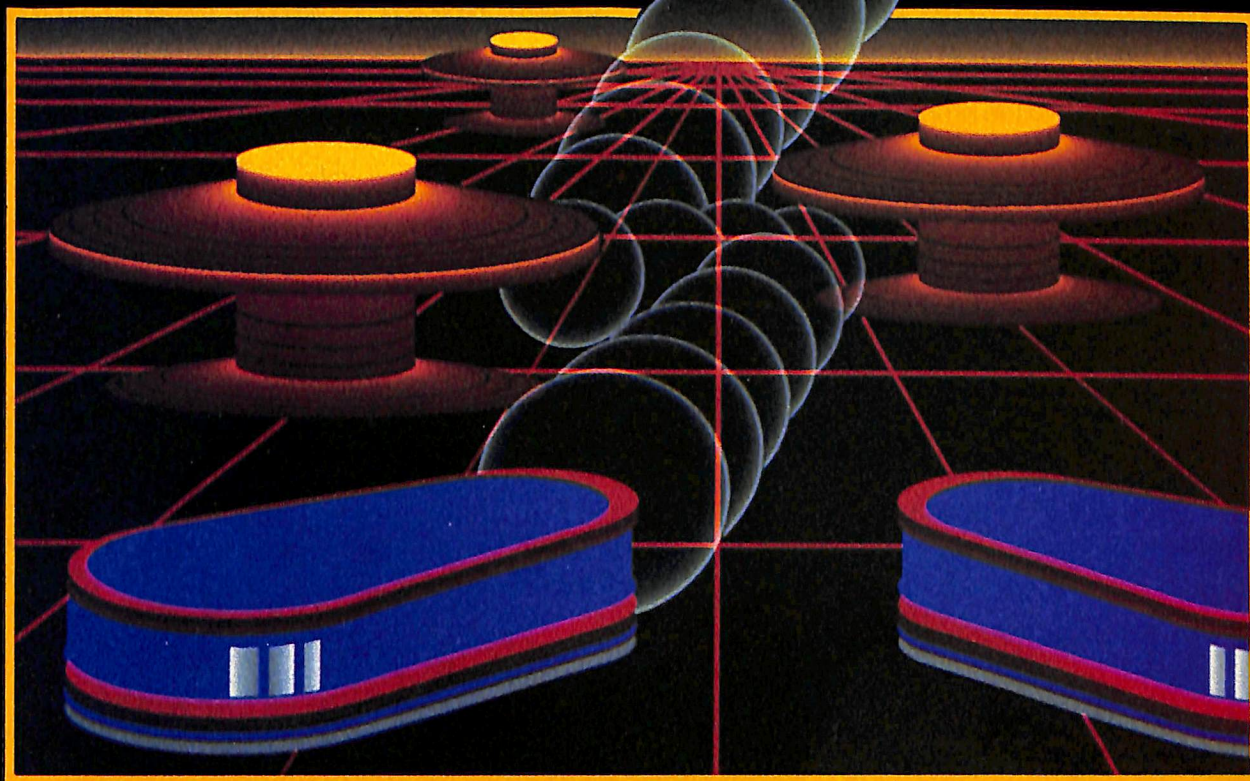
Listing 1. DEMO.

Write to Don Fudge, c/o Avant-Garde Creations, PO Box 30160, Eugene, OR 97403.

TAKE A BREAK!

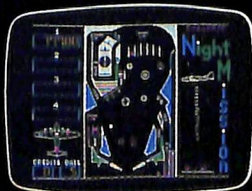
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without moving any paddles first), you will get 58 in the collision counter. Also, what would you guess to be the number of dots in vector shape number one? If you guessed 58, you are correct.

A good rule for doing collision detection during DRAW in Applesoft is: *PEEK (234) in DRAW yields the number of vector shape dots that had collisions.*

Now hit control-reset and change the DRAW in line 20 to an XDRAW. Now run the program (use RUN alone—do not use the name DEMO) and move around on the screen with the paddles, using the space bar to enable movements and new screen data display.

It will soon be apparent that when you XDRAW on a totally vacant spot, the result is 58. But if you XDRAW precisely on top of another shape, the collision counter will receive a zero. Partial superimpositions, in both DRAW and XDRAW mode, result in the collision counter receiving 1-57.

Occasionally you might get a 24, 34, or something else, on your screen. This will make sense if you study both your screen data and the little person. One of the paddle-driven screen coordinates shifted slightly (even though you did not move it), so only partial superimposition was effected.

A good rule for doing collision detection during XDRAW in Applesoft is: *PEEK (234) in XDRAW yields the number of vector shape dots that did not have collisions, which means that the formula for the number of dots that had collisions is, dots in shape minus PEEK (234).*

In Applesoft terms, if you are going to do collision detection after a DRAW, use an IF statement of this type:

```
30 IF PEEK (234) > 0 THEN GOSUB 100:
REM GOSUB 100 IS RESPONSE TO COL-
LISION
```

To do XDRAW collision checking:

```
30 IF PEEK (234) < 58 THEN GOSUB 100:
REM GOSUB 100 IS RESPONSE TO COL-
LISION
```

Collision Detection by Parameter Checking

Collision detection is a core algo-

rithm for most arcade games. If you cannot easily determine if shapes collide, the algorithm will be difficult to write...or will it?

Let's see...If you get stuck with no way to PEEK a collision counter to see if things are running into each other, what you do is *parameter checking* (my term). In this method, you simply compare the coordinates of the last shape moved with the coordinates of all relevant shapes or background areas (or both) on the hires screen. This involves the following type of algorithm:

```
30 IF (XMOVED + PARAMETER > XCOMPARE AND XMOVED - PARAMETER < XCOMPARE) AND (YMOVED + PARAMETER > YCOMPARE AND YMOVED - PARAMETER < YCOMPARE) THEN
GOSUB 100: REM GOSUB 100 IS COLLISION RESPONSE
```

Suppose X is 50, Y is 80, and P is 10 in Figure 2. The rocket is approximately a 20 × 20 shape, with its vec-

tor shape reference (starting) point in the center (*center-referenced*). This means that the real coordinates of the rocket are 50,80, and the coordinate delimiters within which an on-bit in a shape or background will be detected (as a collision) are X=40 to X=60 and Y=70 to Y=90. This translates the IF statement into looking for invaders whose X coordinates are 41-59 and Y coordinates are 71-89.

Center Referencing and Other Ways

Note that the above scheme will only work if all the invading shapes are also center-referenced. This is important, because it is easy to forget this when vector shape drawing, and you end up with a bottom-right (or whatever) referenced shape. It is also important to remember since, when we talk about block shapes or sprites, we are talking about a different type

Go from erase to detect, then start at erase again.

Erase:	XDRAW current shape.
Increment:	X = X + 2 (X coordinate).
Update:	N = N + 1 (shape number).
Draw:	XDRAW new shape at new position.
Delay:	Wait until the new shape has been on the screen for awhile. The longer it is on the screen, the less "gray" flicker, but also the slower and jerkier the movements. Gray flicker results from the shape being erased too frequently to see a clear white image.
Detect:	Is there a collision?

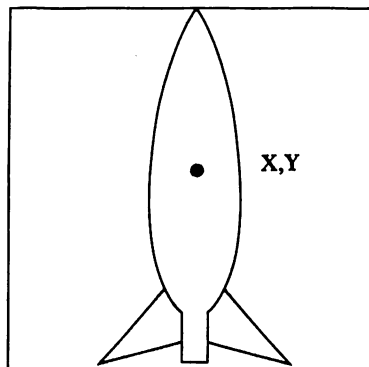
Figure 1. Main program loop steps to XDRAW shape #1.

X - P, Y - P

X + P, Y - P

X - P, Y + P

X + P, Y + P



X = horizontal coordinate
Y = vertical coordinate
P = parameter

Figure 2.

of shape referencing. Sprites (using SuperSprite and StarSprite—see recent *inCiders*) are upper-left-corner referenced. Block shapes are often upper-left-corner referenced also, but this is not an absolute—algorithms could be written many other ways.

When To Use What Method

In both Zero Gravity Pinball and Death Race '82 I used collision counter (PEEKing into 234) checking for my collision detection, and almost all XDRAWing. However, since the programs were written in assembly and run in machine language, I had to PEEK into 234 in assembly ways:

```
LDA $EA
CMP #158 (or BEQ or BNE COLLIDE)
BNE COLLIDE
```

If your program is in Basic and speed is not important, you might use the type of collision checking algorithm in the DEMO. For extra speed, use a compiler such as Speedstar. You must resort to assembly if you still need more speed or the program is too long to compile.

However, the collision counter at 234 (zero page location) is not a panacea. The fact is, if you need it to detect collisions with other shapes only, and not backgrounds, you may be in trouble, because this method detects both. On the other hand, if a car is traveling through a maze it is extremely handy to have the collision counter detect a collision with the background scene. In such a case, it would be a severe handicap for the collision counter to miss background/shape encounters. So it depends upon your application.

Other Types of Shapes

So much for vector shape collisions. What about block shapes and HPLOT shapes? Parameter checking is

the only decent way I know of to detect HPLOT shape collisions. However, block shape collisions are a very different matter.

The normal (234) collision counter location does not respond to block shape manipulations and collisions, so if you want 234 to be your block shape collision counter register, you must clear and set the counter yourself, rather than relying on Applesoft routines.

Depending on the speed requirements of your game algorithms, parameter checking is, of course, also a possibility with block shapes. This is especially so since routines often merely set a collision flag without indicating what collided with what, so the collision handler must do parameter checking, anyway, to make that determination. However, since parameter checks every single program cycle may slow things down too much, it is important to know how to handle block shape collision detection in another way.

Block Shape Collision Detection

Since parameter checking with block shapes is essentially equivalent to parameter checking with any other method, I'll skip on to other methodologies. Suppose our 7-bit-

displayed shape byte is the one in Figure 3 and our background byte is the one in Figure 4. They will combine as in Figure 5 if we use STA to draw.

This would be similar to an Applesoft DRAW, which does not use already present background bits that get drawn upon. With block shapes, whole bytes at a time are dealt with, and in the STA draw mode, the shape bytes simply replace the background bytes as they are loaded and stored onto the hi-res page: "Good-bye background."

In the XDRAW type of screen drawing, the EOR command, we combine background and shape in such a way that bits end up on only if the shape and background bits are different. XDRAW puts the opposite or complement of the color already existing at each point plotted. Similarly, when whole bytes are used for drawing using XDRAWing algorithms, the EORing produces opposites or complements, as in Figure 6.

The great thing about this method is that if you use it to draw and erase, you will find that all backgrounds are left perfectly intact. The weakness is that the displayed shape on a non-blank background is always weird and often less than satisfactory.

Now let's look at collision detection. Neither of the above block shape drawing methods (DRAW and XDRAW) are going to detect collisions. So, let's try the AND instruction. See Figure 7.

With AND we get on-bits only if we find on-bits in both the shape and background bits. In other words, if one on-bit will be superimposed upon another, AND will catch this as a collision. Notice the non-zero result in the above. This means a collision has occurred. In this instance the best thing to do is load this non-zero result into \$EA, if we wish to use this address as a collision flag location. This makes a non-zero flag show up in our collision detector, to be responded to at the end of the main program loop cycle being run.

Sometimes (when colors 4-7 are in use) the color flag (msb) of the hi-res byte will be set, and a simple AND of the shape and background bytes will

Figure 3.

Figure 4.

Figure 5.

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■ ■ ■ ■ ■ ■ shape

 ■ ■ ■ ■ ■ ■ background

 ■ ■ ■ ■ ■ ■ EOR before STA

Figure 6.

■ ■ ■ ■ ■ ■ shape

 ■ ■ ■ ■ ■ ■ background

 ■ ■ ■ ■ ■ ■ AND for collision test

Figure 7.

color flag → ■ ■ ■ ■ ■ ■ shape (with color flag)

 color flag → ■ ■ ■ ■ ■ ■ background (with color flag)

 ■ ■ ■ ■ ■ ■ AND as a test

Figure 8.

not get a good collision detection—as in Figure 8. There is a way to preclude this problem when testing for collisions—by using AND #7F. See Figure 9. ANDing with #7F simply zeros the high bit of the byte operated on. In this case a true collision detection result is obtained.

It would be interesting, but unnecessary, to go into all the assembly code algorithms for DRAWing (and XDRAWing, as well) block shapes with the use of collision detection. However, machine language animation is not the purpose of this column. The basics of collision detection are my focus here. Either parameter detection or ANDing will detect block shape collisions with background or other shapes. For more details you might consult an assembly text.

Now it is time to go beyond all these Apple 6502 considerations and look into the imminent future of Ap-

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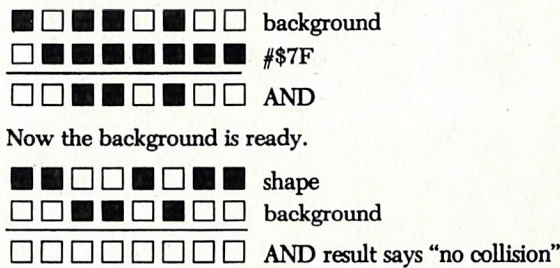


Figure 9.

ple graphics. How will the science of collision detection evolve? With the new SuperSprite technology, utilizing sprites and patterns, how will people check for collisions and how will the various methods apply to various applications?

Sprite Collision Detection

With the new sprite technology, there are two main ways to handle

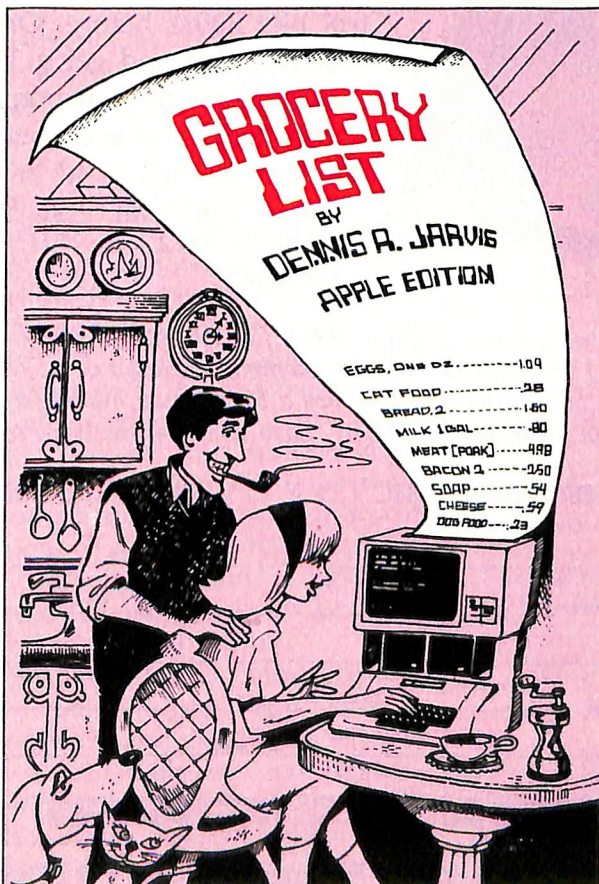
collision detection. Neither is very complicated to explain, but interrupt-driven detection is quite a new approach and deserves a thorough examination, so let's dispense with the easier-to-conceptualize approach first: parameter checking again!

I have used this method in the following applications: StarSprite I Arcade, StarSprite I Maze Game, StarSprite I Aliens & Asteroids, StarSprite

II's Collision Checking by Parameter, and StarSprite II's Zero Gravity Space Frog. The first three games are machine language algorithms that ran so fast, even with the slowdown of parameter checking for collision detection, that I ended up needing delay loops to achieve a decent speed. There would be no point in using speedier techniques when the present ones are already faster than needed. The sprites are so fast, because when you move a sprite with the StarSprite and SuperSprite systems, you merely update a pointer. No background refreshers, pre-shifted shapes, erasing and drawing, color clashes, or byte-by-byte shape transfers are required.

The final application above was a game (Zero Gravity Space Frog) written in Applesoft and Ampersprite as a tutorial tool for examining the limitations and strengths of Basic in games using parameter checking for

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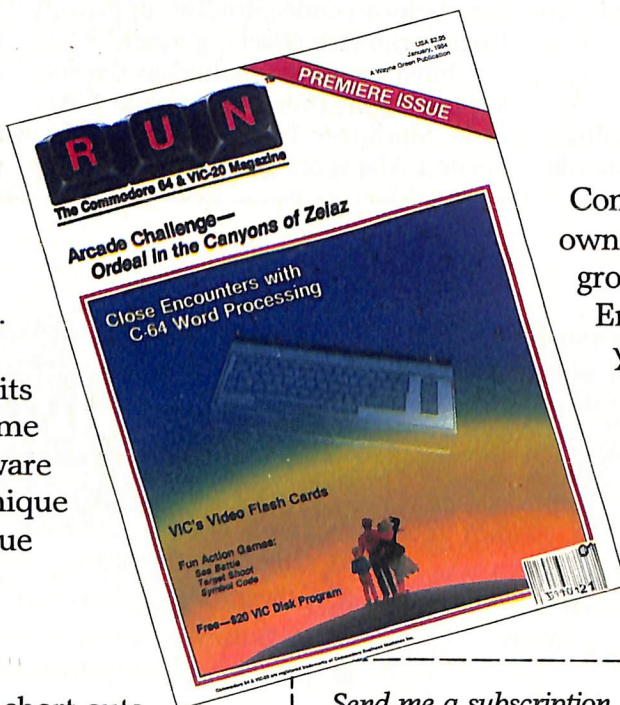
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collision detection. The game reaches the limit of its speed with parameter check collision detection. Such a game would be unthinkable in Applesoft utilizing 6502 graphics, since the graphics manipulations would take up 90 percent of the execution time, slowing all action way down. In my Ampersprite version of the game, however, 90 percent of the execution time is spent on the IFs, ON GOTOs and other time-using commands of normal Applesoft. So you can imagine what a 6502 graphics version would be like.

Collision Detection by Status Register Reading

Now let's get to the nitty-gritty of collision checking. Obviously a good graphics system will have specifically-designed devices that make detection a cinch. The StarSprite board, with a built-in collision detection flag in the status register of its VDP (video display processor) chip (TMS9918A) is no exception. Neither is the StarSprite graphics system, which has an entire language to support sprite collision detection with status register reading. The language is called Ampersprite.int. The suffix means one thing: *interrupt-driven*.

Let me clarify and define some terms. A *status register* is a register whose data byte represents the contents of its bit flags. There is, in the status register of the 6502 processor, a carry flag, an interrupt flag and an overflow flag, to name a few. The TMS9918A VDP (video display processor) on the SuperSprite board is equipped with a status register that has an interrupt flag, a fifth sprite flag, a five-bit fifth sprite register, and a collision flag. The latter is our concern here. When two sprites collide on- or off-screen, this flag is set. Therefore, it is up to the programmer to read this flag whenever he or she wishes to detect collisions.

"Reading" this flag means reading the status register and noticing whether the collision flag is set. If it is, you can simply set a zero page address (\$E8 in Ampersprite.int) as the 6502 memory collision flag location and continue, soon branching to a



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collision handling routine.

Sometimes a flag can be an entire byte or a variable. In the former case I have used \$E8 as the collision flag in such a way that if it ever contains anything but zero, you know there has been a collision. Then you must parameter check to find the sprite nearest the one that caused the collision.

To read the status register you must load the status register byte into the 6502 accumulator and examine it. But it's tricky: You can't just load the status register's contents into the 6502 accumulator whenever you want to know the status of collision detection because there will probably be a disturbance of the display screen. It turns out that the raster scan of a frame of display screen must be completed before status register reading will be unobtrusive.

To solve the problem, the status register's interrupt flag is set (to one) after each raster scan (in which the video screen is refreshed) and is reset to zero after the status register is read or when the VDP is externally reset. If VDP register one's interrupt enable flag is set (VDP interrupts are active), the VDP interrupts will be active *at the end of each display frame*—whenever the interrupt flag is a one. This means that if the 6502 interrupts are active (via the CLI instruction), then interrupts are fully cleared for action by both VDP and 6502, so one interrupt will happen 60 times a second. Each time this interrupt occurs the status register is read and the results stored as flags. The reason the status register is read is that I have included in Ampersprite.int an interrupt-handling routine that does so. If you are an assembly programmer and not using Ampersprite.int in your interrupt-driven status register reading and collision detection, you must supply your own interrupt-handling routine and interrupt vector storing.

Interrupts

You are probably asking just what an *interrupt* is. The 6502 microprocessor is sensitive to three types: RESET, NMI and IRQ. BRK is also an in-

terrupt-generating instruction. I'll concentrate on the IRQ interrupt here.

When an interrupt occurs, the processor's status is saved, further interrupts are disabled until the interrupt-handling routine restores the 6502's interruptability and the interrupt-handling routine is run. This routine must save registers before execution and restore them after execution. The routine reads the status register in Ampersprite.int's case (as well as loading zero page flags).

The purpose of an interrupt is to allow some kind of external device to make something (the status register's status) known to an executing program, without the program having to constantly monitor that function via program execution.

What we want is for the interrupt-handling algorithm to execute 60 times every second while the program is running. This will mean checking the status register 60 times a second to see if any collisions are happening. I would hate to have to handle such precise (video-refresh-synchronized) routine timing via regular assembly program techniques without interrupts.

Since interrupts occur 60 times a second, adjustment of program timing is sometimes indicated by performance idiosyncrasies. I use a 1/40th-of-a-second empty FOR...NEXT loop, occasionally, as a delay after sprite coordinate updating, to insure that one interrupt has occurred before I check the \$E8 zero page collision flag. This has proved effective in a game called Boomerang!, found in the StarSprite II system.

Boomerang! is an Ampersprite.int game, written in Applesoft and interrupt-driven, in which the status register is read 60 times a second during execution. It operates at the limits of Basic for interrupt-driven applications. Since up to 31 sprites reside on the screen at the same time, it's quite important to know what's bumping into what.

Another Ampersprite.int application, called Status Register Use, is a Basic program that not only tests for collisions but for too many sprites

horizontal to each other.

The reason I have been discussing interrupts is that this sophisticated programming technique allows more effective collision detections than do more conventional methods. When you are using some of the more convoluted assembly collision detection schemes for 6502 block shapes, imagine what it would be like to have collision checking happening automatically!

Is this the ultimate in collision detection then? I don't know, but I know it works, it saves time, it's easy to deal with, convenient, and fast. Perhaps the only real drawback to such sophisticated collision-detection techniques is that they just may spoil me! ■

*930.A7A

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0930- 08 00 12 00 41 00 66 00
0938- 89 00 AA 00 E7 00 0E 01
0940- 2F 01 24 24 24 24 24 35
0948- 16 36 75 76 0E 0E 1F 18
0950- 18 18 30 36 36 0E 0E 0E
0958- 76 76 0C D7 DB DB DB 1C
0960- 0C 0C 0C 64 24 24 24 24
0968- BC F2 F6 1E 36 00 00 00
0970- 00 24 24 24 24 24 35 16
0978- 36 36 2E 0E 0E 0F D8 36
0980- 76 76 76 FF DB 1C 0C 0C
0988- 24 24 24 24 24 F4 92 1E
0990- F6 06 00 36 06 00 24 24
0998- 24 24 24 35 16 36 36 2E
09A0- 0E 1F 36 0E 1E 36 36 0E
09A8- FF 1C 0C 0C 0C 24 1C 1F
09B0- 0C 25 24 24 24 00 24 24
09B8- 24 24 24 24 24 24 35 16
09C0- 36 36 36 36 76 F6 1E 0E
09C8- D7 27 24 64 24 24 24 24
09D0- 24 04 00 24 1E 36 1E 36
09D8- 36 00 4D 69 09 0E 6D 3A
09E0- 3F 3F 3F 3F 3F 3F 3F 3F
09E8- 3F 77 29 75 2D 0E 2D 0E
09F0- 2D 0C 2D 0C 2D 0C 2D 0D
09F8- 38 3F 2C DC 1C 1C 1C 1C
0A00- 3F 27 18 36 3F 3F 1E 1E
0A08- 1E 1E 1E 67 11 2D 2D 2D
0A10- 2D 2D 2D 2D 2D 05 00 24
0A18- 24 24 24 24 35 16 36 76
0A20- 0E 0E 07 18 18 36 36 76
0A28- 76 76 0E FF DB DB 1C 0C
0A30- 0C 64 64 24 24 24 24 9E
0A38- F2 1E 1E 1E 00 00 24 24
0A40- 24 24 24 35 16 36 36 2E
0A48- 0E 1F 36 36 76 36 0E FF
0A50- E3 0C 0C 24 24 1C 24 BC
0A58- 1E 04 40 21 24 04 00 24
0A60- 24 24 24 24 35 16 36 36
0A68- 36 2E 1E 76 36 F6 0E 3F
0A70- 24 24 24 E4 67 24 24 24
0A78- 04 00 00
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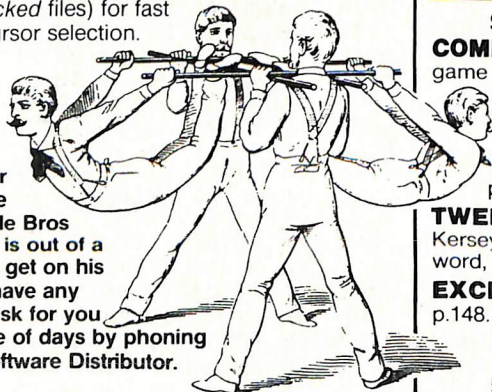
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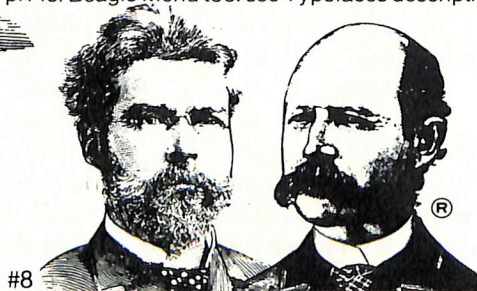
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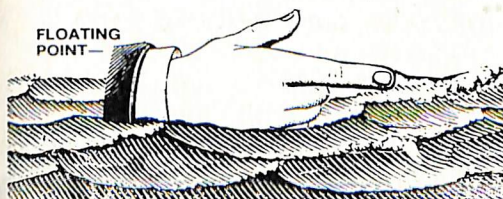
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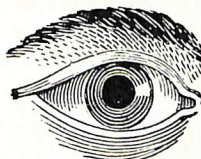
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2 HGR2: FOR R=0 TO 192: ROT=R:
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Where does it go? One minute you're sitting home on vacation. You've got all the time in the world, promising yourself that you're going to finish up all the loose ends. Then it's two days from deadline and nothing's done. Worse than that, it soon strikes you that a year's gone by. With that year, of course, are all the things you planned to do and write about. Needless to say, only about half of them actually got done or written.

It's also an anniversary of sorts, both for me and *inCider* and you guys also. After all, without you, neither one of us would be here. So, to all of you, those of you I got the chance to talk with and those of you, for whatever reasons, I didn't, have a healthy and happy New Year.

Debts Past Due

I have a friend named Chris whom I have promised for the longest time to show how to change the Apple III standard 80-by-24 screen into a 40-by-24 display with color back-

grounds. The only proviso is that whatever you do will appear as grey tones on the Monitor III, true colors on an RGB monitor and probably chaos on an analog color monitor or television. Experience is an accurate teacher.

First, we need a few things to work with. Tables 1, 2 and 3 should help. One is a list of colors the III is capable of generating. The numbers next to them help us explain to SOS which one we want. By using the codes in Table 2, we can set whatever screen mode we desire. The last table contains control codes the Apple II understands to initiate any action. By printing them as character strings (CHR\$) and using any additional command parameters needed, we can manipulate the screen in quite a few ways.

To do this, we now load the programming pistol with some of my favorite weapons. Listings 1a through 1c show them. A long time ago, when I finally resolved that rewriting these routines every time I wrote

a program that needed them was absolutely a waste of time, I saved them all to disk as text files. Now, when they are appropriate, I EXEC them in. Listing 2 will show you how to do that.

One of the benefits of the Apple III is its acceptance of long variable names. That should be taken advantage of at every opportunity. Listing 1a is a good example. By incorporating full descriptions of each of the control codes found in Table 3, it's not necessary to continually refer back to it whenever a function is needed—likewise with the colors available. There's absolutely no reason why the color names themselves can't be used to define the colors we want.

Procedures are another matter. In its simplest form, all the control you need to fully handle any computer screen is a cursor-positioning routine and the ability to erase both to the end of the line and to the end of the screen. Line number 30220 in Listing 1c gives you cursor control, while CLEAR.END .LINE\$ and CLEAR.END.SCREEN\$ provide the obvious actions.

The program itself is contained in Listing 3. You can see where the EXEC'd definitions have been included (lines 30000 through 30220). Added to that is the screen display needed for this program in particular. From line 30300 to 30599 these images are created, their positions on the screen are determined and allocated, and the length of the response is defined. Aside from the questions about corrections, those are, perhaps, the only original sections of the entire program.

Of the program itself, it starts off

Name	Number	Name	Number
Black	0	Brown	8
Magenta	1	Orange	9
Dark Blue	2	Grey	10
Lavender	3	Pink	11
Dark Green	4	Green	12
Grey	5	Yellow	13
Medium Blue	6	Aqua	14
Light Blue	7	White	15

Table 1. The Apple III's color codes.

Mode	Description
0	40 Column Black and White
1	40 Column Color (or Grey Scale)
2	80 Column Black and White

Table 2. Text screen selection modes.

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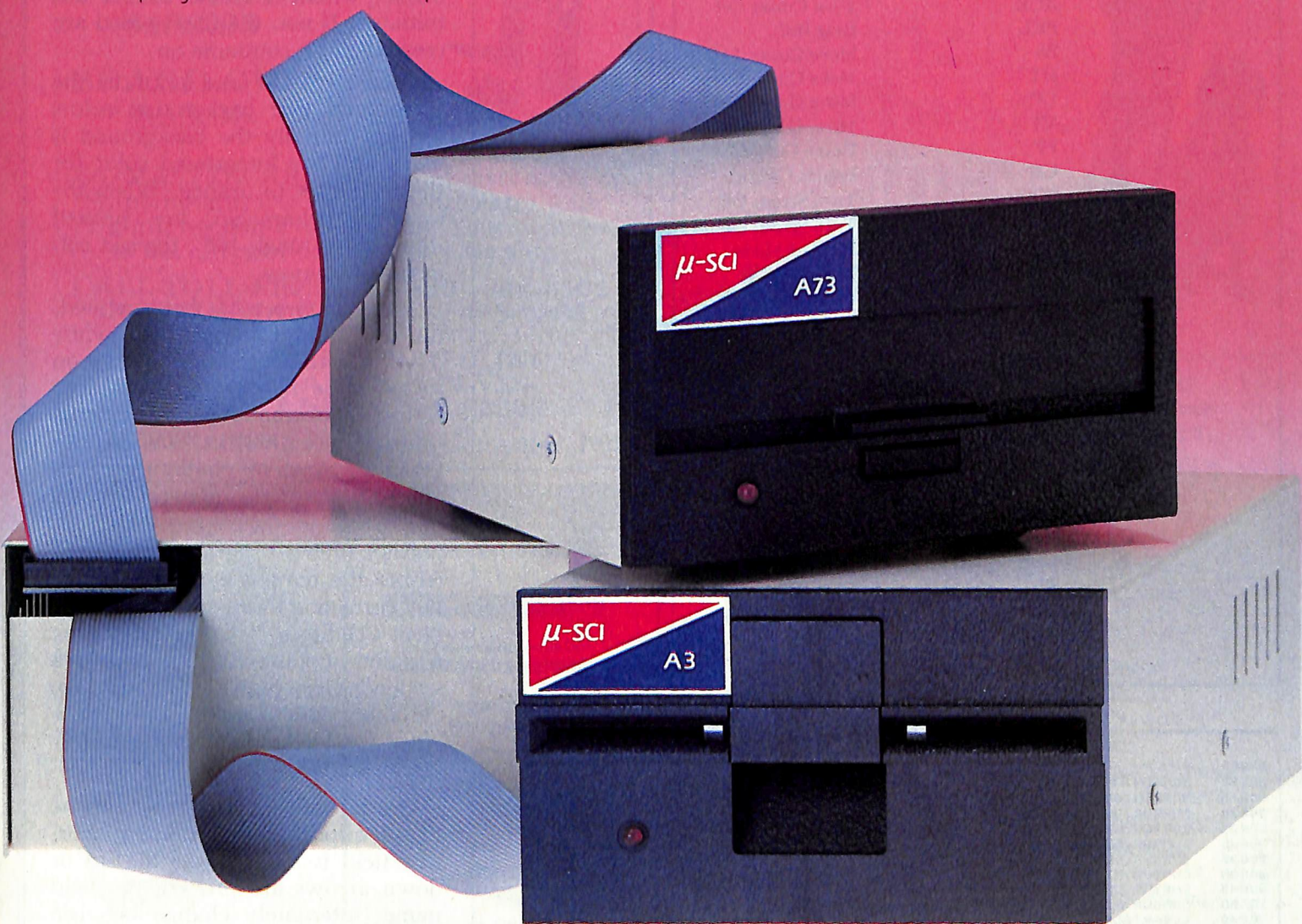
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Code	Name	Argument	Function
00	NUL		No Operation
01	SOH		Save and Reset Viewport
02	STX		Set Upper-left Corner
03	ETX		Set Lower-right Corner
04	EOT		Restore Viewport
05	ENQ		Turn Cursor On
06	ACK		Turn Cursor Off
07	BEL		Ring Bell
08	BS		Move Cursor Left
09	HT		Move Cursor Right
10	LF		Move Cursor Down
11	VT		Move Cursor Up
12	FF		Home Cursor
13	CR		Return Cursor
14	SO		Turn Screen Off
15	SI		Turn Screen On
16	DLE	mode	Set Text Mode
17	DC1		Inverse Off
18	DC2		Inverse On
19	DC3	color	Set Foreground Color
20	DC4	color	Set Background Color
21	NAK	move	Cursor Movement Controls
22	SYN		Synchronize Screen
23	ETB	shift	Horizontal Shift
24	CAN	x	Horizontal Position
25	EM	y	Vertical Position
26	SUB	x y	Absolute Position
27	ESC		No Operation
28	FS		Clear Viewport
29	GS		Clear to End of Viewport
30	RS		Clear Line
31	US		Clear to End of Line

Table 3. Apple III screen control codes.

selecting the mode it operates in (MODE = 1 passed to line 30205 initiates the 40-by-24 color screen display). Then it creates the files we'll be using. If it finds that the files exist (the error code is 33), the error handling section branches to line 32000, where alternate actions are initiated. If not, the files needed are created and it continues on.

Using FCOLOR and BCOLOR the foreground and background colors are set. Initially the background is black and the foreground color for the text is set to orange. When the underline characters are printed (lines 150 through 165), the text color used is orange.

After the screen has been painted, the text color is returned to white (line 210) and the program goes on to get some relevant answers. The actual information is entered through lines 30600 to 30695. Notice that, to preserve continuity, lines 30649 and 30650 manipulate the screen colors depending on what portion of the program is involved (either the normal entry portion or the correction routine if CORRECT.FLAG = 1). Since we are also including a dollar amount, a separate input section is given over to it. As well, the variable NUMBER.FLAG is set to 1 when we are accepting numbers only because of formatting conventions.

During the correction section, the screen display changes as the incorrect field is selected. As the up or down arrows are pressed, the field names alternately change between white and orange to indicate activity. Corrections themselves are done in an aqua background with black letters. All very pretty—some of it

```

30000 REM ---- DEFINITION SECTION ----
30010 SCREEN.ON$=CHR$(15)
30015 SCREEN.OFF$=CHR$(14)
30020 CURSOR.ON$=CHR$(5)
30025 CURSOR.OFF$=CHR$(6)
30030 CURSOR.HOME$=CHR$(12)
30035 CURSOR.LEFT$=CHR$(8)
30040 CURSOR.RIGHT$=CHR$(9)
30045 CURSOR.UP$=CHR$(11)
30050 CURSOR.DOWN$=CHR$(10)
30060 CLEAR.SCREEN$=CHR$(28)
30065 CLEAR.END.LINE$=CHR$(31)
30070 CLEAR.LINE$=CHR$(30)
30075 CLEAR.END.SCREEN$=CHR$(29)
30080 INVERSE.ON$=CHR$(18)
30085 INVERSE.OFF$=CHR$(17)
30099 RETURN

```

Listing 1a. Predefined variables.

```

30100 REM ---- COLOR DEFINITIONS ----
30105 BLACK=0
30110 MAGENTA=1
30115 DARK.BLUE=2
30120 LAVENDER=3
30125 DARK.GREEN=4
30130 GREY=5
30135 MEDIUM.BLUE=6
30140 LIGHT.BLUE=7
30145 BROWN=8
30150 ORANGE=9
30155 PINK=11
30160 GREEN=12
30165 YELLOW=13
30170 AQUA=14
30175 WHITE=15

```

Listing 1b. Color definitions.

```

30200 REM ---- PROCEDURES ----
30205 PRINT CHR$(16);CHR$(MODE);:RETURN:REM -- SCREEN MODE
30210 PRINT CHR$(19);CHR$(FCOLOR);:RETURN:REM -- FOREGROUND COLOR
30215 PRINT CHR$(20);CHR$(BCOLOR);:RETURN:REM -- BACKGROUND COLOR
30220 PRINT CHR$(26);CHR$(COL);CHR$(ROW);:RETURN:REM -- POSITION CURSOR

```

Listing 1c. Procedures.

```

1 OPEN #1,"<drivename>/<filename>"
2 OUTREC=255
3 OUTPUT #1
4 LIST
5 CLOSE #1

```

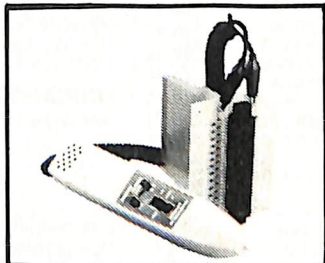
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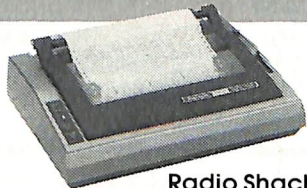
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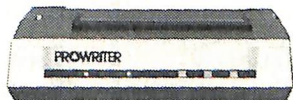
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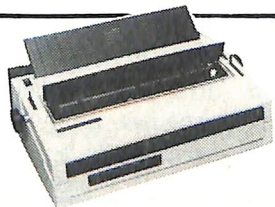
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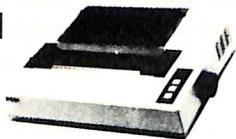
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actually functional—and it's an excellent example of using the different displays to catch the eye.

On the Home Front

If you've been following the news at all, you might be aware that the "other guy" on the block is having a bit of trouble with the new 2.0 operating system. Rumor has it that Apple has graciously offered to show them how to do it right. When I search back through the cobwebs, I seem to remember reading somewhere a caustic little bit of sophomoreic semi-wit about the many and varied operating systems available through the course of the Apples' lives.

"What would a New Year be without resolutions?"

I have on hand right now (in my time) a copy of BPI General Ledger and a test copy of the payroll package. After a brief reading through the documentation (it is overpowering in scope) I find that it is a double entry system, of which I am not overly fond. The more keystrokes you give someone, the greater the chance of an error. Although I consider this a liability, the program as a whole seems to be well done. With some minor exceptions in their early days, BPI has always produced outstanding work, although their protection scheme for the Apple II was ludicrous. As soon as I can look at it closely, I'll let all you accountant types know what I think. (For the record, I have not yet found an accounting package that was more than adequate; BPI is going to have to perform.)

Resolutions

What would a New Year be without resolutions? There are a lot of

Listing 3. RECORDS.BAS program for creating screen display with colored background.

```

10 GOSUB 30000:PRINT SCREEN$:PRINT SCREEN.OFF$
20 GOSUB 30100:GOSUB 30300:GOSUB 30400:GOSUB 30500
30 MODE=1
35 GOSUB 30205
50 ON ERR GOTO 32000
60 CREATE"RECORDS", DATA,155
65 OFF ERR
67 OPEN#1,"RECORDS"
70 CREATE"LRECRECORDS", DATA
75 OPEN#2,"LRECRECORDS"
80 WRITEN#2;LASREC%
85 CLOSE#2
100 REM ----- BEGIN SCREEN PAINT -----
105 BCOLOR=BLACK:GOSUB 30215
110 :
115 FOR X=1 TO 6
120   ROW=X:COL=POS(1,X)
125   GOSUB 30220
130   IF CORRECT.FLAG=1 THEN 140
135   FCOLOR=ORANGE:GOSUB 30210
140   PRINT LINE$(1,X);
145   IF CORRECT.FLAG=1 THEN RETURN
150   FCOLOR=BROWN:GOSUB 30210
155   FOR Y=1 TO LENGTH(1,X)
160     PRINT"_";
165     NEXT Y
170   :
175   :
180   NEXT X
185   ROW=X:COL=POS(1,X)
190   GOSUB 30220
195   IF CORRECT.FLAG=1 THEN 205
200   FCOLOR=ORANGE:GOSUB 30210
205   PRINT LINE$(1,X);
210   FCOLOR=WHITE:GOSUB 30210
215   IF CORRECT.FLAG=1 THEN RETURN
220   PRINT SCREEN.ON$
230   :
300 REM ----- DATA INPUT DIRECTIONS -----
320 FOR X=1 TO 6
325   PRINT CURSOR.ON$
330   ENTRY$=""
335   ROW=X:COL=15:GOSUB 30220
340   GOSUB 30600:IF A$=CHR$(27) THEN 32500
345   PRINT CURSOR.OFF$
350   IF ENTRY$="" THEN ITEM$(X)=OLD.ITEM$:GOTO 360
355   ITEM$(X)=ENTRY$
360   ROW=X:COL=15:GOSUB 30220:PRINT CLEAR.END.LINE$:GOSUB 30220
370   PRINT ITEM$(X)
375   IF CORRECT.FLAG=1 THEN RETURN
385   NEXT
400 REM ----- MONEY -----
405 PRINT CURSOR.ON$
410 NUMBER.FLAG=1
420 ENTRY$=""
440 ROW=7:COL=15:GOSUB 30220
450 GOSUB 30600
455 PRINT CURSOR.OFF$
460 IF ENTRY$="" THEN ITEM$(X)=OLD.ITEM$:GOTO 470
465 ITEM$(X)=ENTRY$
470 IF CORRECT.FLAG=1 THEN RETURN
475 IF CORRECT.FLAG=1 THEN RETURN
480 ROW=7:COL=15:GOSUB 30220:PRINT CLEAR.END.LINE$:GOSUB 30220
485 PRINT USING"#####.###";VAL(ITEM$(X))
490 NUMBER.FLAG=0
500 REM ----- CORRECTIONS -----
510 ROW=10:COL=1:GOSUB 30220
515 PRINT"CORRECTIONS (Y/N) ? ";
520 GET ANSWER$
530 IF ANSWER$="Y" THEN ANSWER$="Y":ELSE IF ANSWER$="N" THEN ANSWER$="N"
540 IF ANSWER$<>"Y" AND ANSWER$<>"N" THEN 520
550 IF ANSWER$="N" THEN CORRECT.FLAG=0:GOTO 31000
600 CORRECT.FLAG=1
610 ROW=10:COL=1:GOSUB 30220:PRINT CLEAR.END.LINE$:GOSUB 30220
620 PRINT"USE UP/DOWN ARROW KEYS TO SELECT"
625 PRINT"RETURN KEY BEGINS CORRECTIONS"
630 PRINT"ESCAPE LEAVES EDIT MODE"
635 FCOLOR=WHITE:GOSUB 30210
640 X=1:GOSUB 120
650 GET A$
655 IF A$<>CHR$(10) AND A$<>CHR$(11) AND A$<>CHR$(27) AND A$<>CHR$(13) THEN
660   FCOLOR=ORANGE:GOSUB 30210
665   IF X<7 THEN GOSUB 120:ELSE IF X=7 THEN GOSUB 185
670   IF A$=CHR$(27) OR A$=CHR$(13) THEN 800
675   IF A$=CHR$(10) THEN X=X+1:GOTO 700
680   IF A$=CHR$(11) THEN X=X-1:GOTO 700
700   IF X<1 THEN X=7:ELSE IF X>7 THEN X=1
705   FCOLOR=WHITE:GOSUB 30210
710   IF X<7 THEN GOSUB 120:ELSE GOSUB 185
720   GOTO 650

```

Listing continued.

Listing continued.

```

800 IF A$=CHR$(27) THEN 1000
805 ROW=X:COL=15:GOSUB 30220:FCOLOR=BROWN:GOSUB 30210:IF X<7 THEN FOR Y=1 TO
    LENGTH(1,X):PRINT "-";NEXT Y:GOSUB 30220
807 IF X=7 THEN BCOLOR=BLACK:GOSUB 30615:PRINT CLEAR.END.LINE$:GOSUB 30220
810 FOR Y=10 TO 12:ROW=Y:COL=0:GOSUB 30220:PRINT CLEAR.END.LINE$:NEXT Y
815 ROW=X:COL=15:GOSUB 30220
820 :
825 BCOLOR=AQUA:FCOLOR=BLACK
830 GOSUB 30210:GOSUB 30215
840 ENTRY$=""
845 IF X=7 THEN GOSUB 400:GOTO 875
850 GOSUB 30600
860 IF ENTRY$="" THEN ITEM$(X)=OLD.ITEM$:GOTO 875
870 ITEM$(X)=ENTRY$
875 FCOLOR=WHITE:BCOLOR=BLACK
880 GOSUB 30210:GOSUB 30215
885 ROW=X:COL=15:GOSUB 30220:PRINT CLEAR.END.LINE$:GOSUB 30220
890 IF NUMBER.FLAG=1 THEN NUMBER.FLAG=0:PRINT USING"#####.###";VAL(ITEM$(X)):
    GOTO 900
895 PRINT ITEM$(X)
900 GOTO 500
30000 REM ---- DEFINITION SECTION ----
30010 SCREEN.ON$=CHR$(15)
30015 SCREEN.OFF$=CHR$(14)
30020 CURSOR.ON$=CHR$(5)
30025 CURSOR.OFF$=CHR$(6)
30030 CURSOR.HOME$=CHR$(12)
30035 CURSOR.LEFT$=CHR$(8)
30040 CURSOR.RIGHT$=CHR$(9)
30045 CURSOR.UP$=CHR$(11)
30050 CURSOR.DOWN$=CHR$(10)
30060 CLEAR.SCREEN$=CHR$(28)
30065 CLEAR.END.LINE$=CHR$(31)
30070 CLEAR.LINE$=CHR$(30)
30075 CLEAR.END.SCREEN$=CHR$(29)
30080 INVERSE.ON$=CHR$(18)
30085 INVERSE.OFF$=CHR$(17)
30099 RETURN
30100 REM ---- COLOR DEFINITIONS ----
30105 BLACK=0
30110 MAGENTA=1
30115 DARK.BLUE=2
30120 LAVENDER=3
30125 DARK.GREEN=4
30130 GREY=5
30135 MEDIUM.BLUE=6
30140 LIGHT.BLUE=7
30145 BROWN=8
30150 ORANGE=9
30155 PINK=11
30160 GREEN=12
30165 YELLOW=13
30170 AQUA=14
30175 WHITE=15
30199 RETURN
30200 REM ---- PROCEDURES ----
30205 PRINT CHR$(16);CHR$(MODE);:RETURN:REM -- SCREEN MODE
30210 PRINT CHR$(19);CHR$(FCOLOR);:RETURN:REM -- FOREGROUND COLOR
30215 PRINT CHR$(20);CHR$(BCOLOR);:RETURN:REM -- BACKGROUND COLOR
30220 PRINT CHR$(26);CHR$(COL);CHR$(ROW);:RETURN:REM -- POSITION CURSOR
30300 REM ---- SCREEN PAINT SECTION ----
30310 LINE$(1,1)="Artist: "
30315 LINE$(1,2)="Album Title: "
30320 LINE$(1,3)="Label: "
30325 LINE$(1,4)="Category 1: "
30330 LINE$(1,5)="Category 2: "
30335 LINE$(1,6)="Reviewed for: "
30340 LINE$(1,7)="Payment: "
30399 RETURN
30400 REM ---- POSITION SECTION ----
30405 POS(1,1)=7
30410 POS(1,2)=2
30415 POS(1,3)=8
30420 POS(1,4)=3
30425 POS(1,5)=3
30430 POS(1,6)=1
30435 POS(1,7)=6
30499 RETURN
30500 REM ---- LENGTH DEFINITION ----
30505 LENGTH(1,1)=25
30510 LENGTH(1,2)=25
30515 LENGTH(1,3)=20
30520 LENGTH(1,4)=25
30525 LENGTH(1,5)=25
30530 LENGTH(1,6)=25
30535 LENGTH(1,7)=8
30599 RETURN
30600 REM ---- INPUT DATA ----
30605 OLD.ITEM$=ITEM$(X)
30610 GET A$
30615 IF ASC(A$)>31 THEN 30655
30620 IF A$=CHR$(27) THEN RETURN
30625 IF A$=CHR$(13) THEN RETURN

```

Listing continued.

them, to say the least. There is some new product on the way for the III, and I hope to get to it via my usual connections and sources. I'd really like to get a look at the revamped Graphics Tablet and the driver for the Apple III. Coupled with some work on the new plotter, I could get a half-dozen or so architects off my back.

Has anyone really taken a look at the Apple-supplied programs on the Business Basic disk? Just in case no one has, somewhere along the way (perhaps next month), we will. One in particular that interested me was a module that allowed reading random tracks and sectors of a disk. More as things develop.

***"inCider copies are
being used to sweeten
Apple III sales."***

Loose Ends

There has been more than one request that I supply some of the programs I include here on Apple III readable disks (I've been told that in some circles *inCider* copies are being used to sweeten Apple III sales). In general, doing something like that is a pain when it's done on a personal level, but I'll see what can be done. Stay tuned to these same channels for further information.

About a year ago, I had an article appear in *inCider* about graphics and the Apple III (January 1983, "Apple III Artisan," p. 78). It included a program that used joystick input to manipulate the graphics cursor (reproduced here in Listing 4). It was well received with the only exception being a RETURN WITHOUT GOSUB error appearing. The problem with that was an elusive ON KBD statement that I buried in the text (being new and brash). Also, not everyone owned a joystick.

Recently, I had occasion to show a car stereo dealer a way to use an Apple III to keep records on the various car models and, in general, impress his customers with graphic displays of the various equipment configurations (Figure 1). Of course, just before I baffled him with capabilities, my joystick came down with a terminal case of puppy-chew-itis. Being ever resourceful, I rewrote the program to use the arrow keys and got rid of a few GOSUBs that might cause confusion (see Listing 5).

As it's set up, pressing the S key (all key inputs are done with uppercase characters) will ask for a predefined shape (either a large auto audio amplifier, a small one, or two different sizes of rectangles). Using G will ask for a disk drive and filename to which to save the currently

"Being ever resourceful, I rewrote the program."

drawn screen; P and D are drawing commands; M lets the pencolor be set; C clears the screen and E ends the program. Before running it, make sure you have a .GRAFIX driver in SOS.DRIVER and a copy of BGRAF.INV on the logged disk. Type in INVOKE BGRAF.INV (just the first time you use it) and then run the program. Using the numeric keys will change the step size for the cursor (1 moves one dot-space, 9 moves nine).

Somewhere between the two copies of the program, you should get a good idea of what the III's graphics are all about. Dive in and research what you don't understand—you can find all the answers in the Business Basic manuals and the Standard Device Drivers book.

That's it for another month. Personally, I'm amazed at what can be done in two days. Enjoy the holidays everybody, and the good weather. In the meantime, Ciao bene, AppleAmerica. ■

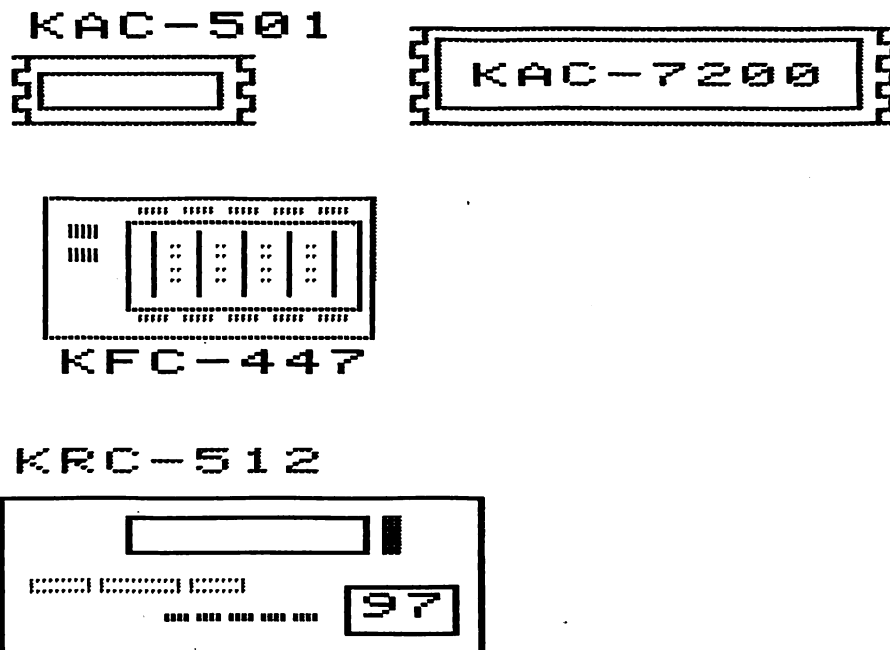


Figure 1. Sample output from GRAFKEYS.BAS.

Listing continued.

```

30630 IF A$<>CHR$(8) THEN 30655
30635 IF A$=CHR$(8) AND LEN(ENTRY$)=0 THEN 30610
30640 IF A$=CHR$(8) AND LEN(ENTRY$)=1 THEN ENTRY$="":GOTO 30648
30645 IF A$=CHR$(8) THEN ENTRY$=LEFT$(ENTRY$,LEN(ENTRY$)-1)
30648 IF NUMBER.FLAG=1 THEN 30680
30649 IF CORRECT.FLAG=1 THEN BCOLOR=BLACK:GOSUB 30215:FCOLOR=BROWN:GOSUB 302
10:PRINT CHR$(8);"-";CHR$(8);:FCOLOR=BLACK:GOSUB 30210:BCOLOR=AQUA:GOS
UB 30215:GOTO 30610
30650 FCOLOR=BROWN:GOSUB 30210:PRINT CHR$(8);"-";CHR$(8);:FCOLOR=WHITE:GOSUB
30210:GOTO 30610
30655 IF ASC(A$)<32 THEN 30610:ELSE IF NUMBER.FLAG=1 AND VAL(A$)=0 AND A$<>
0" AND A$<>" THEN 30610
30660 ENTRY$=ENTRY$+A$
30665 IF NUMBER.FLAG=1 THEN 30680:ELSE PRINT A$;
30670 IF LEN(ENTRY$)=LENGTH(1,X) THEN RETURN
30675 GOTO 30610
30680 ROW=7:COL=15:GOSUB 30220
30685 PRINT USING"#####.###";VAL(ENTRY$)
30690 ROW=7:COL=15:GOSUB 30220
30695 IF LEFT$(RIGHT$(ENTRY$,3),1)=". " OR LEN(ENTRY$)=5 AND INSTR(ENTRY$,". "
)=0 THEN RETURN:ELSE GOTO 30610
31000 LASREC%=LASREC%+1
31010 RECORD%=ITEM$(1)+ITEM$(2)+ITEM$(3)+ITEM$(4)+ITEM$(5)+ITEM$(6)+ITEM$(7)
31015 WRITEN1,LASREC%;RECORD%
31020 CORRECT.FLAG=0
31025 PRINT CLEAR.SCREEN$:GOTO 100
32000 OFF ERR
32005 IF ERR<>33 THEN STOP
32010 OPEN#2,"LRECRECORDS"
32015 READ#2,LASREC%
32020 CLOSE#2
32025 OPEN#1,"RECORDS"
32030 GOTO 100
32050 GOTO 100
32500 REM ---- END ----
32505 OPEN#2,"LRECRECORDS"
32510 WRITEN2,LASREC%
32520 CLOSE:TEXT:PRINT CLEAR.SCREEN%
32530 END

```

```

10 HOME:DIM C$(590)
1000
1020 PREFIX$=".D1"
1040 OPEN#1,".GRAFIX"
1060 INVOKE"BGRAF.INV"
1070 PERFORM INITBRAFIX
1100 PCOLOR=15
1120 BUFFER=1
1140 MODE=3
1150 GOSUB 9000

```

Listing 4. The original GRAFPROG.BAS program, using joystick input to manipulate the graphics cursor.

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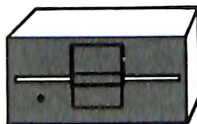
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Listing continued.

```

1160  PERFORM GRAFIXMODE(%MODE,%BUFFER)
1180  PERFORM GRAFIXON
1200  PERFORM PENCOLOR(%15)
1220  COLOR%=0
1240  PERFORM FILLCOLOR(%COLOR%)
1260  PERFORM FILLPORT
1280  FLAG=1
1300  Y%=PDL(3)*YFACTOR:X%=PDL(2)*XFACTOR
1310  GOTO 5700
1420  IF KBD=67 THEN PERFORM FILLCOLOR(%COLOR%);PERFORM FILLPORT
1425  IF KBD=71 THEN PERFORM GSAVE."PIC"+STR$(COUNT):COUNT=COUNT+1
1430  IF KBD=69 THEN 1520
1435  IF KBD=68 THEN 5600
1440  IF KBD=84 THEN 5000
1445  IF KBD=80 THEN 5200
1450  IF KBD=83 THEN 6000
1455  IF KBD=77 THEN 10000
1457  IF KBD=65 THEN 20000
1460  ON KBD GOTO 1420
1480  RETURN
1500  :
1520  PERFORM RELEASE:PERFORM RELEASE:PERFORM RELEASE
1540  CLOSE
1560  HOME:PRINT CHR$(15)
1580  END
5000  REM
5005  REM
5010  PERFORM PENCOLOR(%0):PERFORM DOTAT(%XX,%YY):PERFORM PENCOLOR(%PCOLOR)
5020  GET A$
5030  IF A$=CHR$(27) THEN BFLAG=1:GOTO 1460
5040  IF ASC(A$)<32 THEN 5020
5050  PRINT#1,A$;
5060  GOTO 5020
5200  REM
5202  REM
5203  PERFORM PENCOLOR(%PCOLOR)
5205  IF BUTTON(2)<>0 THEN GOTO 1460
5210  Y%=PDL(3)*YFACTOR:X%=PDL(2)*XFACTOR
5220  PERFORM LINETO(%XX,%YY)
5230  GOTO 5205
5600  REM
5602  REM
5603  PERFORM PENCOLOR(%PCOLOR)
5605  IF BUTTON(2)<>0 THEN BFLAG=1:PERFORM PENCOLOR(%PCOLOR):GOTO 1460
5610  Y%=PDL(3)*YFACTOR:X%=PDL(2)*XFACTOR
5660  PERFORM DOTAT(%XX,%YY)
5670  GOTO 5605
5700  REM
5705  REM
5707  PREFIX$=".D1"
5710  ON KBD GOTO 1420
5715  PERFORM MOVETO(%XX,%YY)
5720  DCOLOR%= EXFN%.XYCOLOR
5730  :
5735  :
5750  PERFORM PENCOLOR(%15):PERFORM DOTAT(%XX,%YY)
5770  PERFORM DOTAT(%XX,%YY):PERFORM DOTAT(%XX,%YY)
5780  :
5790  Y%=PDL(3)*YFACTOR:X%=PDL(2)*XFACTOR
5795  GOTO 5710
6000  REM
6005  REM
6007  PARAM=0:PERFORM PENCOLOR(%PCOLOR)
6010  GET A$
6015  IF A$=CHR$(27) THEN 1460
6020  IF A$<>"S" AND A$<>"L" AND A$<>"R" AND A$<>"C" AND A$<>"T" AND A$<>"P" THEN 6010
6025  SHAPE$=A$
6035  Y%=PDL(3)*YFACTOR:X%=PDL(2)*XFACTOR
6036  PERFORM MOVETO(%XX,%YY)
6037  DCOLOR%= EXFN%.XYCOLOR
6040  IF BUTTON(2)<>0 THEN LOCAT(PARAM,0)=X%:LOCAT(PARAM,1)=Y%:PERFORM DOTAT(%XX,%YY):PARAM=PARAM+1:FOR X=1 TO 100:NEXT X:GOTO 6050
6045  PERFORM DOTAT(%XX,%YY):PERFORM PENCOLOR(%DCOLOR%):PERFORM DOTAT(%XX,%YY):PERFORM PENCOLOR(%PCOLOR)
6050  IF SHAPE$="S" AND PARAM=2 OR SHAPE$="R" AND PARAM=2 THEN 6100
6055  IF SHAPE$="T" AND PARAM=3 THEN 6200
6057  IF SHAPE$="L" AND PARAM=2 THEN 6500
6060  IF SHAPE$="C" AND PARAM=2 THEN 6400
6065  IF SHAPE$="P" AND PARAM=4 THEN 6300
6070  GOTO 6035
6100  PARAM=0
6105  PERFORM MOVETO(%LOCAT(0,0),%LOCAT(0,1))
6110  PERFORM LINETO(%LOCAT(0,0),%LOCAT(1,1))
6115  PERFORM LINETO(%LOCAT(1,0),%LOCAT(1,1))
6120  PERFORM LINETO(%LOCAT(1,0),%LOCAT(0,1))
6125  PERFORM LINETO(%LOCAT(0,0),%LOCAT(0,1))
6130  PARAM=0:GOTO 6010
6200  PERFORM MOVETO(%LOCAT(0,0),%LOCAT(0,1))
6210  PERFORM LINETO(%LOCAT(1,0),%LOCAT(1,1))
6215  PERFORM LINETO(%LOCAT(2,0),%LOCAT(2,1))
6220  PERFORM LINETO(%LOCAT(0,0),%LOCAT(0,1))
6230  PARAM=0:GOTO 6010
6300  PERFORM MOVETO(%LOCAT(0,0),%LOCAT(0,1))
6310  PERFORM LINETO(%LOCAT(1,0),%LOCAT(1,1))
6315  PERFORM LINETO(%LOCAT(2,0),%LOCAT(2,1))
6320  PERFORM LINETO(%LOCAT(3,0),%LOCAT(3,1))
6325  PERFORM LINETO(%LOCAT(0,0),%LOCAT(0,1))
6330  PARAM=0:GOTO 6010
6500  PERFORM MOVETO(%LOCAT(0,0),%LOCAT(0,1))
6510  PERFORM LINETO(%LOCAT(1,0),%LOCAT(1,1))
6530  PARAM=0:GOTO 6010

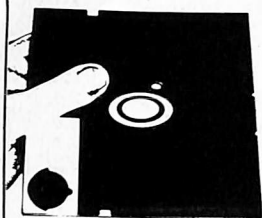
```

Listing continued.

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PAT. PEND.

Listing continued.

```

9000 IF MODE=0 OR MODE=1 THEN XFACTOR=279/255
9010 IF MODE=2 THEN XFACTOR=539/255
9020 IF MODE=3 THEN XFACTOR=139/255
9030 YFACTOR=191/255
9050 RETURN
10000 TEXT:HOME
10010 VPOS=15:HPOS=15
10020 INPUT"NEW COLOR: ";PCOLOR
10040 PERFORM GRAFIXON
10050 GOTO 1460
20000 IF MODE<>2 THEN 21000
20005 OPEN#2,".PRINTER"
20010 PRINT#2;CHR$(27);CHR$(84);"03"
20020 FOR Y1%=191 TO 0 STEP-1
20025 PRINT#2;CHR$(27);CHR$(83);CHR$(48);CHR$(53);CHR$(54);CHR$(48);
FOR X1%=0 TO 559
20030 FOR X1%=0 TO 559
20040 PERFORM MOVETO(X1%,Y1%)
20050 INPUT#1;C$;IF ASC(C$)=64 THEN C=0:ELSE C=192
20055 PRINT#2;CHR$(C);
20060 NEXT X1%;PRINT#2;CHR$(0)
20120 NEXT Y1%
20130 CLOSE#2
20140 GOTO 1460
21000 IF MODE=3 THEN 22000
21005 OPEN#2,".PRINTER"
21010 PRINT#2;CHR$(27);CHR$(84);"03"
21020 FOR Y1%=191 TO 0 STEP-1
21025 PRINT#2;CHR$(27);CHR$(83);CHR$(48);CHR$(50);CHR$(56);CHR$(48);
FOR X1%=0 TO 279
21040 PERFORM MOVETO(X1%,Y1%)
21050 INPUT#1;C$;IF ASC(C$)=64 THEN C=0:ELSE C=192
21055 PRINT#2;CHR$(C);
21060 NEXT X1%;PRINT#2;CHR$(0)
21120 NEXT Y1%
21130 CLOSE#2
21140 GOTO 1460
22000 OPEN#2,".PRINTER"
22010 PRINT#2;CHR$(27);CHR$(84);"03"
22020 FOR Y1%=191 TO 0 STEP-1
22025 PRINT#2;CHR$(27);CHR$(83);CHR$(48);CHR$(53);CHR$(54);CHR$(49);
FOR X1%=0 TO 139
22040 PERFORM MOVETO(X1%,Y1%)
22050 INPUT#1;C$;IF ASC(C$)=64 THEN C=0:ELSE C=192
22055 PRINT#2;CHR$(C);CHR$(C);CHR$(C);CHR$(C);
22060 NEXT X1%;PRINT#2;CHR$(0)
22120 NEXT Y1%
22130 CLOSE#2
22140 GOTO 1460

```

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Listing 5. GRAFKEYS.BAS. Variant of Listing 4, using the Apple III's keyboard arrows to move the cursor.

```

10 HOME
1000 INC=1
1020 PREFIX$=".PROFILE/BASIC"
1040 OPEN#1,".GRAFIX"
1060 REM INVOKE".D1/BGRAF.INV"
1070 PERFORM INITGRAFIX
1100 PCOLOR=15
1120 BUFFER=1
1140 MODE=2
1150 GOSUB 9000
1160 PERFORM GRAFIXMODE(MODE,BUFFER)
1180 PERFORM GRAFIXON
1200 PERFORM PENCOLOR(15)
1220 COLOR%=0
1240 PERFORM FILLCOLOR(COLOR%)
1260 PERFORM FILLPORT
1280 FLAG=1
1300 :
1310 GOTO 5700
1400 PERFORM PENCOLOR(DCOLOR%);PERFORM DOTAT(X%,Y%)
1401 :
1402 :
1403 :
1405 IF KBD>47 AND KBD<58 THEN INC=VAL(CHR$(KBD));GOTO 1460
1408 :
1409 :
1410 IF KBD>27 THEN 1420
1415 IF KBD=10 THEN 8500
1416 IF KBD=11 THEN 8000
1417 IF KBD=8 THEN 7000
1418 IF KBD=21 THEN 7500
1419 IF KBD=27 THEN DFLAG=0:GOTO 1460
1420 :
1421 IF KBD=67 THEN PERFORM FILLCOLOR(COLOR%);PERFORM FILLPORT
1422 IF KBD=72 THEN X%=0:Y%=0:GOTO 1460
1423 IF KBD=78 THEN DFLAG=0:GOTO 1460
1425 IF KBD=71 THEN 20000
1430 IF KBD=69 THEN 1520
1432 IF KBD=68 THEN DFLAG=1:GOTO 1460
1435 :
1440 IF KBD=84 THEN 5000
1442 IF KBD=76 THEN 5200

```

Listing continued.

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Listing continued.

```

1445 IF KBD=80 THEN DFLAG=2:GOTO 1460
1450 IF KBD=83 THEN 6000
1455 IF KBD=77 THEN 10000
1460 DCOLOR%= EXFN%.XYCOLOR
1462 IF DFLAG=2 THEN PERFORM PENCOLOR(%PCOLOR):PERFORM LINETO(%X%,%Y%)
1464 IF DFLAG=1 THEN PERFORM PENCOLOR(%PCOLOR):PERFORM DOTAT(%X%,%Y%)
1466 IF DFLAG=0 THEN PERFORM MOVETO(%X%,%Y%):DCOLOR%= EXFN%.XYCOLOR
1468 DCOLOR%= EXFN%.XYCOLOR
1470 ON KBD GOTO 1400
1480 RETURN
1500 :
1520 PERFORM RELEASE:PERFORM RELEASE:PERFORM RELEASE
1521 PERFORM release:PERFORM release
1540 CLOSE
1560 HOME:PRINT CHR$(15)
1580 END
5000 REM -----
5005 REM
5010 PERFORM PENCOLOR(%):PERFORM DOTAT(%X%,%Y%):PERFORM PENCOLOR(%PCOLOR)
5020 GET A$
5030 IF A$=CHR$(27) THEN 1460
5040 IF ASC(A$)<32 THEN 5020
5050 PRINT#1;A$;
5060 GOTO 5020
5200 REM -----
5202 REM
5203 PERFORM PENCOLOR(%PCOLOR)
5205 :
5210 :
5220 PERFORM LINETO(%X%,%Y%)
5230 GOTO 1460
5600 REM -----
5602 REM
5603 PERFORM PENCOLOR(%PCOLOR)
5605 :
5610 PERFORM PENCOLOR(%PCOLOR)
5611 PERFORM MOVETO(%X%,%Y%)
5612 PERFORM DOTAT(%X%,%Y%)
5660 :
5670 RETURN
5700 REM -----
5705 REM
5707 :
5710 ON KBD GOTO 1400
5715 PERFORM MOVETO(%X%,%Y%)
5720 REM DCOLOR%= EXFN%.XYCOLOR:KFLAG=1
5735 PERFORM PENCOLOR(%):PERFORM DOTAT(%X%,%Y%)
5737 :
5750 PERFORM PENCOLOR(%15):PERFORM DOTAT(%X%,%Y%)
5755 KFLAG=0
5760 PERFORM PENCOLOR(%DCOLOR%):PERFORM DOTAT(%X%,%Y%):KFLAG=1
5770 :
5780 :
5790 :
5795 GOTO 5715
6000 REM -----
6005 REM
6010 TEXT:HOME:INPUT"WHICH SHAPE: ";SHAPE$
6012 IF SHAPE$="AMP1" THEN PERFORM GRAFIXON:GOTO 6020
6014 IF SHAPE$="AMP2" THEN PERFORM GRAFIXON:GOTO 6320
6016 IF SHAPE$="SQ1" THEN PERFORM GRAFIXON:GOTO 6560
6018 IF SHAPE$="SQ2" THEN PERFORM GRAFIXON:GOTO 6660
6020 REM ----- SMALL AMP -----
6021 PERFORM PENCOLOR(%PCOLOR)
6022 OX%=X%:OY%=Y%
6023 XMUL%=7*MUL
6024 PERFORM LINETO(%X%+XMUL%,%Y%)
6025 :
6026 FOR TIME=1 TO 3
6027 PERFORM LINETO(%X%+XMUL%,%Y%+4)
6028 IF TIME=3 THEN PERFORM MOVETO(%X%,%Y%+4):Y%=Y%+4:GOTO 6070
6030 PERFORM LINETO(%X%,%Y%+4)
6040 PERFORM LINETO(%X%,%Y%+8)
6050 PERFORM LINETO(%X%+XMUL%,%Y%+8)
6060 Y%=Y%+8
6070 NEXT TIME
6075 XMUL%=150*MUL
6080 PERFORM LINETO(%X%+XMUL%,%Y%):X%=X%+XMUL%
6085 XMUL%=7*MUL
6090 PERFORM MOVETO(%X%-XMUL%,%Y%)
6095 FOR TIME=1 TO 3
6100 PERFORM LINETO(%X%-XMUL%,%Y%-4)
6105 IF TIME=3 THEN PERFORM MOVETO(%X%,%Y%-4):Y%=Y%-4:GOTO 6150
6110 PERFORM LINETO(%X%,%Y%-4)
6120 PERFORM LINETO(%X%,%Y%-8)
6130 PERFORM LINETO(%X%-XMUL%,%Y%-8)
6140 Y%=Y%-8
6150 NEXT TIME
6155 XMUL%=150*MUL
6160 PERFORM LINETO(%X%-XMUL%,%Y%)
6170 X%=OX%:Y%=OY%
6175 XMUL%=15*MUL
6180 PERFORM MOVETO(%X%+XMUL%,%Y%+5)
6184 IF MODE=3 THEN XMUL%=130*MUL:GOTO 6190
6185 XMUL%=135*MUL
6190 PERFORM LINETO(%X%+XMUL%,%Y%+5)
6200 PERFORM LINETO(%X%+XMUL%,%Y%+15)
6205 XMUL%=15*MUL
6210 PERFORM LINETO(%X%+XMUL%,%Y%+15)
6220 PERFORM LINETO(%X%+XMUL%,%Y%+5)

```

Listing continued.

Listing continued.

```

6230 GOTO 6999
6320 REM ----- LARGE AMP -----
6321 PERFORM PENCOLOR(%PCOLOR)
6322 OX=X:OY=Y%
6323 XMUL%=7*MUL
6324 PERFORM LINETO(OX+XMUL%,OY%)
6325 :
6326 FOR TIME=1 TO 4
6327 PERFORM LINETO(OX+XMUL%,OY%+4)
6328 IF TIME=4 THEN PERFORM MOVETO(OX%,OY%+4):Y%=Y%+4:GOTO 6370
6330 PERFORM LINETO(OX%,OY%+4)
6340 PERFORM LINETO(OX%,OY%+8)
6350 PERFORM LINETO(OX+XMUL%,OY%+8)
6360 Y%=Y%+8
6370 NEXT TIME
6375 XMUL%=300*MUL
6380 PERFORM LINETO(OX+XMUL%,OY%):OX=X+XMUL%
6385 XMUL%=7*MUL
6390 PERFORM MOVETO(OX-XMUL%,OY%)
6395 FOR TIME=1 TO 4
6400 PERFORM LINETO(OX-XMUL%,OY%-4)
6405 IF TIME=4 THEN PERFORM MOVETO(OX%,OY%-4):Y%=Y%-4:GOTO 6450
6410 PERFORM LINETO(OX%,OY%-4)
6420 PERFORM LINETO(OX%,OY%-8)
6430 PERFORM LINETO(OX-XMUL%,OY%-8)
6440 Y%=Y%-8
6450 NEXT TIME
6455 XMUL%=300*MUL
6460 PERFORM LINETO(OX-XMUL%,OY%)
6470 OX=OX:OY=Y%
6475 XMUL%=15*MUL
6480 PERFORM MOVETO(OX+XMUL%,OY%+5)
6485 XMUL%=280*MUL
6490 PERFORM LINETO(OX+XMUL%,OY%+5)
6500 PERFORM LINETO(OX+XMUL%,OY%+25)
6505 XMUL%=15*MUL
6510 PERFORM LINETO(OX+XMUL%,OY%+25)
6520 PERFORM LINETO(OX+XMUL%,OY%+5)
6530 GOTO 6999
6560 REM ----- LARGE SQUARE -----
6570 :
6575 :
6580 PERFORM PENCOLOR(%PCOLOR)
6585 XMUL%=300*MUL
6590 PERFORM LINETO(OX+XMUL%,OY%)
6600 PERFORM LINETO(OX+XMUL%,OY%+45)
6605 :
6610 PERFORM LINETO(OX%,OY%+45)
6620 PERFORM LINETO(OX%,OY%)
6630 GOTO 6999
6660 REM ----- FACEPLATE -----
6670 :
6675 :
6680 PERFORM PENCOLOR(%PCOLOR)
6685 XMUL%=150*MUL
6690 PERFORM LINETO(OX+XMUL%,OY%)
6700 PERFORM LINETO(OX+XMUL%,OY%+10)
6705 :
6710 PERFORM LINETO(OX%,OY%+10)
6720 PERFORM LINETO(OX%,OY%)
6999 DCOLOR%=EXFN%.XYCOLOR:GOTO 1460
7000 REM LEFT ARROW
7005 OX=X-INC
7010 IF OX<0 THEN Y%=Y%-1:OX=XLAST:GOTO 7050
7015 :
7020 GOTO 1460
7050 IF Y%<0 THEN Y%=YLAST
7055 :
7060 GOTO 1460
7500 REM RIGHT ARROW
7505 OX=X+INC
7510 IF OX>XLAST THEN Y%=Y%+1:OX=0:GOTO 7550
7515 :
7520 GOTO 1460
7550 IF Y%>YLAST THEN Y%=0
7555 :
7560 GOTO 1460
8000 REM UP ARROW
8005 Y%=Y%-INC
8010 IF Y%>YLAST THEN Y%=0
8015 :
8020 GOTO 1460
8500 REM DOWN ARROW
8505 Y%=Y%+INC
8510 IF Y%<0 THEN Y%=YLAST
8515 :
8520 GOTO 1460
9000 IF MODE=0 OR MODE=1 THEN XLAST=279:MUL=279/559
9010 IF MODE=2 THEN XLAST=559:MUL=1
9020 IF MODE=3 THEN XLAST=139:MUL=139/559
9030 YLAST=191
9050 RETURN
10000 TEXT:HOME
10010 VPOS=15:HPOS=15
10020 INPUT"NEW COLOR: ";PCOLOR
10040 PERFORM GRAFIXON
10050 GOTO 1460
20000 REM ----- SAVE PICTURE -----
20010 TEXT:HOME
20020 INPUT"WHAT FILENAME: ";NAME$
20030 PERFORM GSAVE.NAME$
20040 PERFORM GRAFIXON:GOTO 1460

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Bent on Business

by Gregory R. Glau

Cash Flow Woes

No matter how much you've got or how much you'd like to have, at the bottom of every business transaction is *cash*. By any standard, cash is an accurate measurement of how effectively you've done your job. The profit equation is simple: If you have enough cash left at the end of the year, you've done things right. If not, you've done something wrong.

Unfortunately, too many businesspeople look at cash from a myopic viewpoint: They know what they've got coming in, but don't consider what's promised to creditors. Remember that cash does *flow*, both into your business and out of it (although sometimes more seems to go out than in).

Woe be unto the business that

suddenly finds itself in a deficit cash position. This occurs especially in seasonal businesses, when sales are concentrated during a few months. Even a business whose sales are generally steady can have this problem, if good advertising or a special promotion creates a rapid increase in sales.

Cash Difficulties

It seems odd that an *increase* in sales can cause a cash flow problem, but it happened to my business this year. Unless your business is handled on a purely cash basis (your customers pay you at the time of purchase and you pay for your materials and labor on the day you buy them), you can quickly find yourself in a sales-rich/cash-poor condition. Your Ap-

ple, I'm happy to say, can help solve this problem.

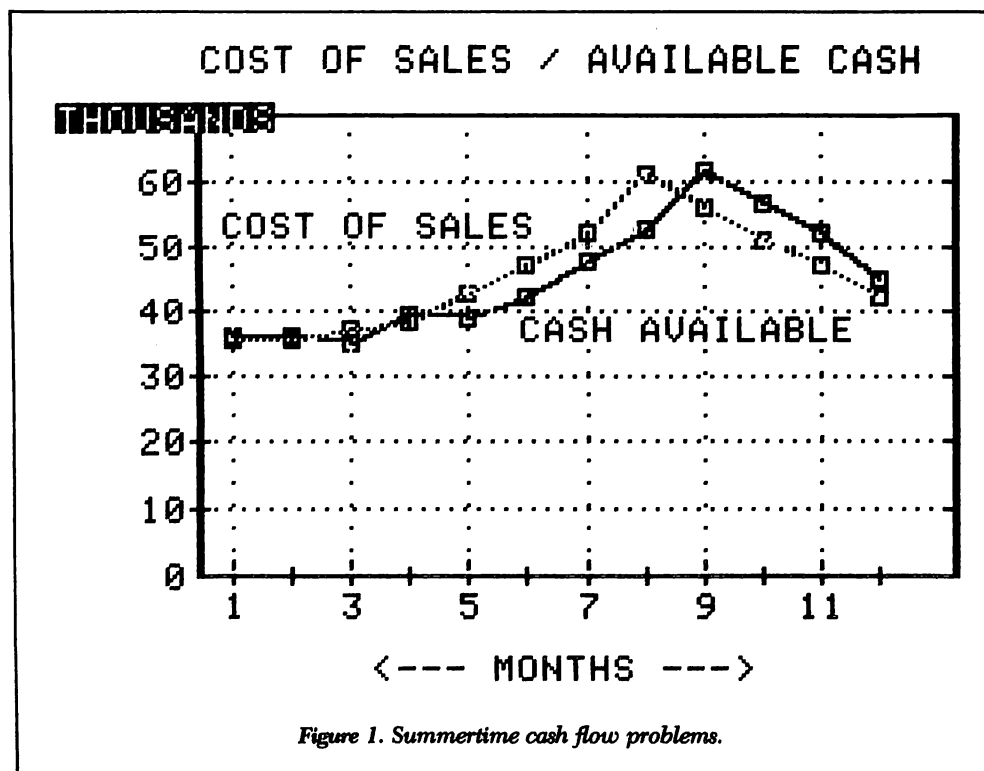
Most businesses allow customers to charge at least part of their purchases. Suppliers, in turn, carry accounts for the materials businesses buy. The problem comes along when customer payments to a business are less than the amounts the business has to pay out. When a business has a sudden spurt in sales, its cash situation can quickly become unstable. Among the easiest ways to understand this condition is to create a monthly graph.

A Prosperity Problem

For the purposes of this illustration, let's assume the business in question works on an 89 percent cost basis. (Materials plus labor plus overhead average out to 89 percent of its sales volume.) If all goes well, the business will be left with an 11 percent profit before taxes. Let's also assume this business has a 60-day collection period, during which it will receive about 90 percent of the dollar volume of its sales total. If it sells \$40,000 worth of merchandise in March, it can expect to collect about 90 percent of that (\$36,000) in May.

Naturally, this is only an average, and some months will be better than others (and some will be worse) in terms of both sales and cash receipts.

This problem can jump up and grab a business because it often has to pay its suppliers and employees and even its overhead items *before* the cash arrives for the work done. Most businesses rock along pretty well—part of



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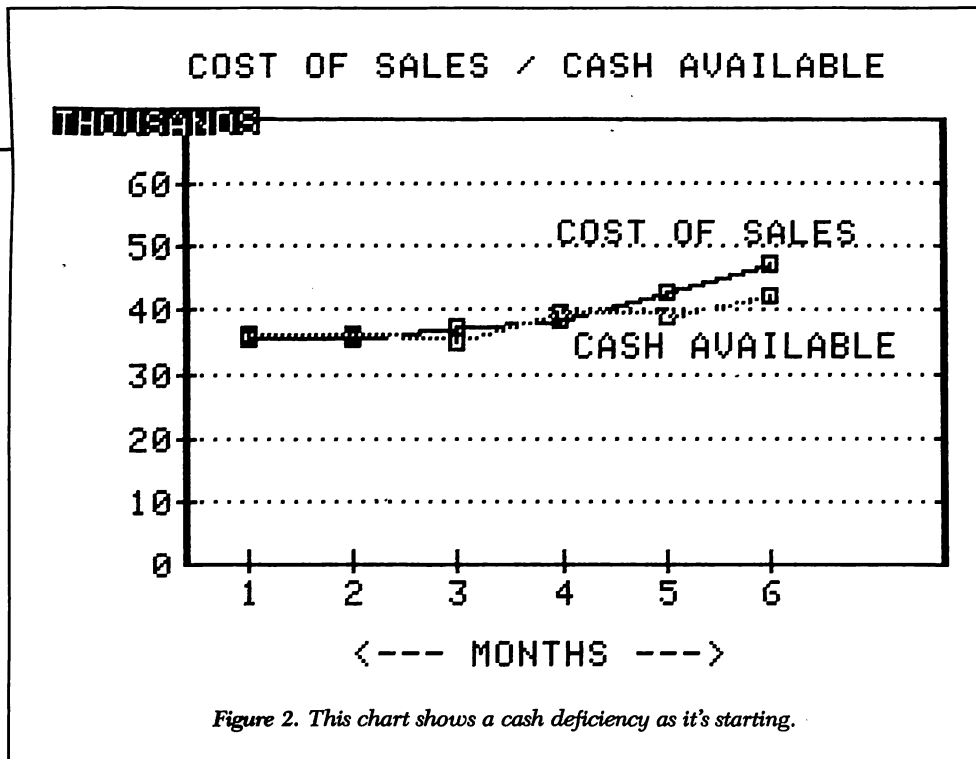
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that other 10 percent of their sales dollar eventually comes in, adding to monthly cash inflow. The condition is self-correcting in that cash will catch up with costs, but in the meantime there's a problem.

A Moving Picture

Figure 1's dashed line on the twelve-month graph reflects the monthly cost of sales—the dollars this business had to pay out each month for materials, labor and overhead items to keep the show running. The solid line plots the monthly cash collected.

While I could have chosen a column chart for this comparison, I believe a line graph better portrays the *movement* of the data. Since you're working with the inflow and outgo of cash, any information about the movement of those dollars is helpful.

For the first four months of the year the amounts were similar; this business received as much cash as it had to send out. While it couldn't build up a backlog of funds, at least it wasn't going in the hole. In May the situation changed. Sales started to spurt, and so did the *cost* of sales. The cash available increased, too, but since it lagged behind sales for 60 days, it wasn't felt as quickly as were the increased costs. Suddenly, because of the rapid rise in sales (and its associated costs), the business found itself sales-rich and cash-poor.

Naturally, as time goes along, things will even out. Cash eventually will catch up with the cost of sales. In this example, by September enough cash began arriving to exceed the cost totals created by the sales volume.

However, while this yearly picture displays both the summertime problem and its eventual reversal, it's important to realize the danger of this deficit condition. During the May–September period the business owner found him/herself without enough cash to pay bills. While the money came in *eventually*, that's not much help when a creditor is on the phone asking for payment of an old invoice.

The Secret

To understand how to solve this cash flow problem, take a look at when it started. Figure 2 plots the same cost and cash data as Figure 1 did, but only for the first half of the year. The business owner who charts these monthly amounts would have seen Figure 2 at the end of June. What would you think if this were your business? Would you be happy with the situation Figure 2 portrays?

The alert manager would notice how the cash situation deteriorated between April and May. The trend of the two lines shows them growing wider apart—a clear sign that the

cash position is turning negative.

The graph, however, doesn't indicate what caused the shift. Customers might have stopped paying. The business may have made some major purchases that were reflected in the cost figures. In any case, when June's figures showed a worse cash deficit, the business clearly knew it had better do something about the inflow of cash, and do it fast.

This situation *never* should have been allowed to progress through a whole year, as Figure 1 illustrates. Something should have been done back when the problem started, back in May and June. With a monthly graph of these two figures, the business owner would have a chart like Figure 2 to warn of impending difficulty.

Business owners can guard against this situation. If you can't change to a purely cash basis (and many businesses *must* allow their customers to charge their purchases), ask for more money as a down payment. Perhaps you can work on a *draw* basis, where you collect something each month, based on the percentage of your work that's completed. You might ask your customers to pay for the equipment as it's delivered. You could try to get sales financed through a local bank (or even on a bank card), so you collect as quickly as you complete your job or deliver the product to your customer.

An Early Warning

Keep a running picture of the vital areas of your business—especially cash. When *cash flow* is combined with your *cost of sales*, you can spot developing trends in the data, notice when costs exceed cash, and see which way and at what rate the lines are moving. That's the purpose of this graphic examination—to spy a problem before it happens. If you find your business with a similar picture to what Figure 2 shows you, look around for the cause. Think of a monthly chart depicting your cash and costs as an early warning system that really can help your cash flow. ■

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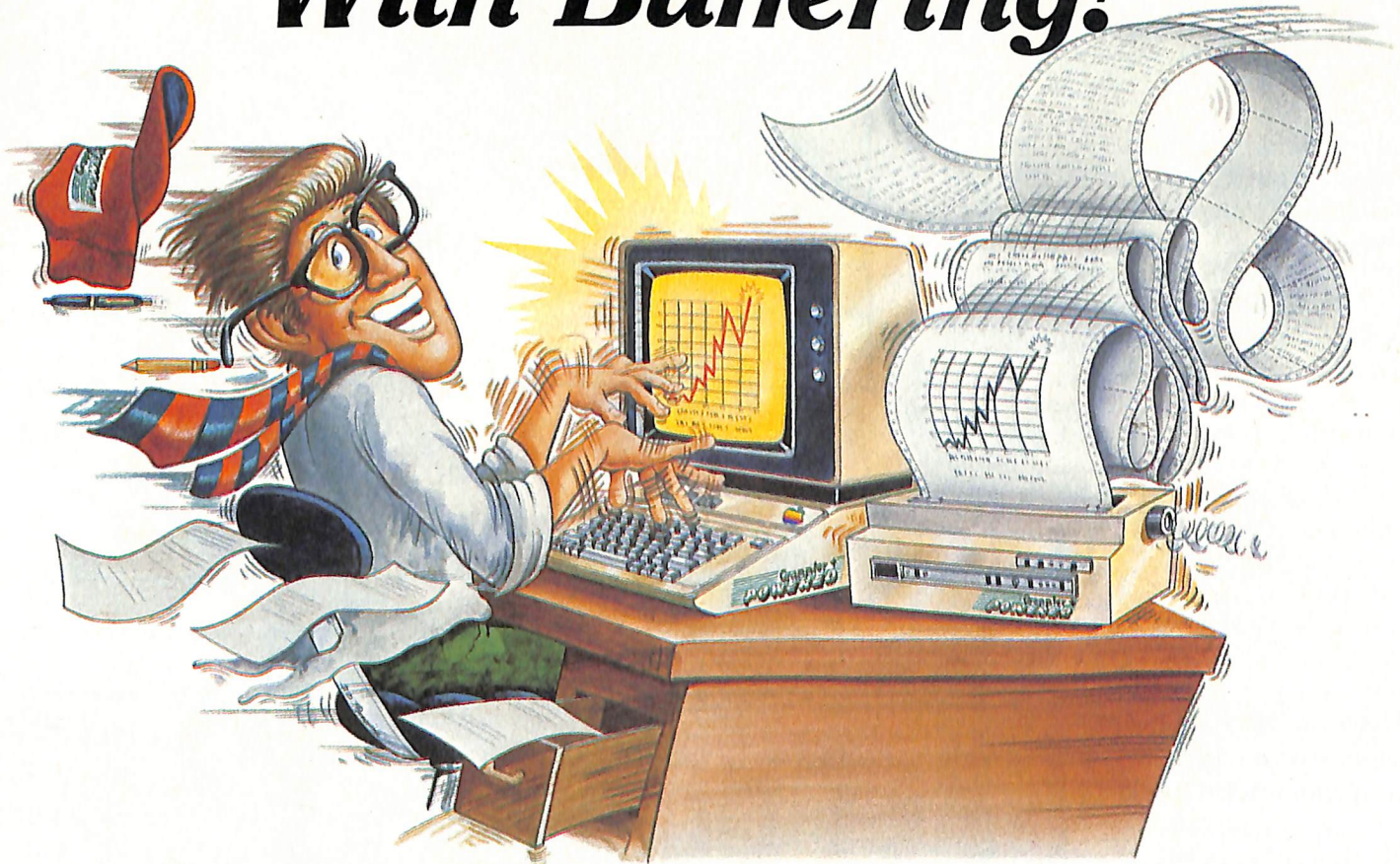
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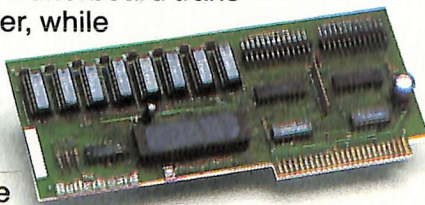
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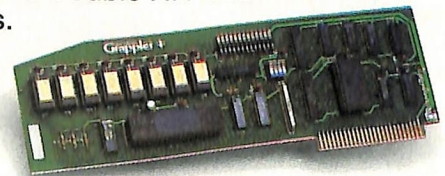
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Apple Page Dump

by Todd Ogasawara

Listing 1. A 6502 assembly language routine to display the contents of one page (256 bytes) of memory on the Apple II. This routine is totally relocatable and occupies 102 bytes.

```

10  * command format          *
11  * use from monitor level  *
12  * FF:pg# N 300G          *
13  * where pg# is the page # you *
14  * want to view           *
15  *                          *
16  *****
17
18  COUT    =    $FDED    ;print contents of A
19  PRBYTE  =    $FDDA    ;print contents of A in hex
20  PRNTAX  =    $F941    ;print A(hi) X(lo) in hex
21
22  LOC     =    $FE      ;page zero pointer
23
24
25  * note that bit 7 must be set
26  SETHI   =    %10000000 ;mask for printable ASCII
27  CR      =    $8D      ;carriage return
28  ESC     =    $9B      ;escape
29  SPACE   =    $A0      ;space
30  COLON   =    $BA      ;colon
31  KYBD    =    $C000    ;kybd strobe
32
33
34          ORG    $300
35          OBJ    $300
36  0300: A0 00    LDY    #0      ;set lo# byte to zero
37  0302: B4 FE    STY    LOC
38
39  0304: A5 FF    LOOP    LDA    LOC+1
40          A6 FE    LDY    LOC
41  0308: 20 41 F9    JSR    PRNTAX    ;print addr
42          A9 BA    LDA    #COLON
43  030D: 20 ED FD    JSR    COUT    ;print colon
44  0310: A9 A0    PBYTE   LDA    #SPACE    ;print space after colon
45  0312: 20 ED FD    JSR    COUT
46
47  0315: B1 FE    LDA    (LOC),Y    ;print 8 hex bytes
48  0317: 20 DA FD    JSR    PRBYTE
49  031A: C8        INY
50  031B: C0 0B    CPY    #8
51  031D: D0 F1    BNE    PBYTE
52
53  031F: A9 A0    LDA    #SPACE    ;print space after hex dump
54  0321: 20 ED FD    JSR    COUT
55
56  0324: A0 00    LDY    #0
57  0326: A2 00    LDY    #0
58  0328: B1 FE    PASCII  LDA    (LOC),Y
59          C9 20    CMP    #32    ;chk for printable ASCII
60          90 0B    BLT    NOPE    ;if not printable, then skip
61          C9 A0    CMP    #A0
62          BGE    OK        ;make sure it is printable
63          C9 00    CMP    #00
64          BLT    OK
65  0336: A9 A0    NOPE    LDA    #SPACE    ;if not valid, print space
66
67          09 00    OK     ORA    #SETHI    ;set high bit
68  033A: 20 ED FD    JSR    COUT    ;print ASCII char to screen
69  033D: E6 FE    INC    LOC    ;incr relative addr counter
70
71  033F: A5 FE    LDA    LOC    ;chk if half page printed
72  0341: C9 A0    CMP    #A0
73  0343: F0 14    BEQ    KLOOP    ;branch to pause if half page printed
74
75  0345: E8        KYRTS  INX
76          E0 0B    CPX    #8        ;chk if 8 ASCII chars printed
77  0348: D0 DE    BNE    PASCII
78
79  034A: A9 A0    LDA    #SPACE    ;if so, do next line
80  034C: 20 ED FD    JSR    COUT

```

Listing continued.

The Apple Monitor allows the user to examine, modify and move the contents of memory. However, the Apple Monitor does not display the contents of a page of memory (256 bytes) in both hexadecimal and ASCII. The program Apple Page Dump provides this feature. Apple Page Dump, written entirely in 6502 assembly language, is only 102 bytes long, is totally relocatable, and uses only two bytes of page zero (\$FE-\$FF). A printout appears in Listing 1.

Apple Page Dump can be used at either the monitor level or from Applesoft. The procedure for use at the monitor level (if it is located at \$0300) is as follows:

FF:pg N 300G

where pg is the page of memory (RAM or ROM) that you wish to examine. For instance, to display the contents of page \$D100 (see Listing 2), you would type:

FF:D1 N 300G

Eight bytes per line is displayed on the screen in the format:

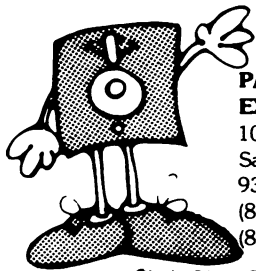
addr: 8hb 8 ASCII

where addr indicates the address of the first of the eight bytes, 8hb is the contents of the eight bytes following addr in hexadecimal form, and 8 ASCII is the display of the printable characters. If a location contains a non-printable ASCII character (e.g., a control character), a space is printed. A short Applesoft program

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Listing continued.

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0351: 20 ED FD 82	JSR COUT	
0354: A5 FE 85	LDA LOC	;chk for end of page
0356: D0 AC 86	BNE LOOP	
0358: 60 87	RTS	
0359: AD 00 C0 89	KLOOP LDA KYBD	;chk kybd
035C: C9 7B 90	CMP #ESC	;chk for ESC key
035E: F0 F8 91	BEQ EXIT	;exit program if pressed
0360: C9 A0 92	CMP #SPACE	;scan for spacebar press
0362: D0 F5 93	BNE KLOOP	;keep looping if no press
0364: F0 DF 94	BEQ KYRTS	;otherwise return to main routine

Symbol table - alphabetical order:

COLON = \$BA	COUT = \$FDED	CR = \$BD	ESC = \$9B
EXIT = \$0358	KLOOP = \$0359	KYBD = \$C000	KYRTS = \$0345
LOC = \$FE	LOOP = \$0304	NOPE = \$0336	OK = \$0338
PASCII = \$0328	PBYTE = \$0310	PRBYTE = \$FDDA	PRNTAX = \$F941
SETHI = \$80	SPACE = \$A0		

Symbol table - numerical order:

SETHI = \$80	CR = \$BD	ESC = \$9B	SPACE = \$A0
COLON = \$BA	LOC = \$FE	LOOP = \$0304	PBYTE = \$0310
PASCII = \$0328	NOPE = \$0336	OK = \$0338	KYRTS = \$0345
EXIT = \$0358	KLOOP = \$0359	KYBD = \$C000	PRNTAX = \$F941
PRBYTE = \$FDDA	COUT = \$FDED		

that calls Apple Page Dump is shown in Listing 3.

```
FF:D1 N 300G
D100: D4 48 4C 49 CE 56 4C 49 THLINVL
D108: CE 48 47 52 B2 48 47 D2 NHGR2HGR
D110: 48 43 4F 4C 4F 52 BD 48 HCOLOR=H
D118: 50 4C 4F D4 44 52 41 D7 PLOTDRAW
D120: 58 44 52 41 D7 48 54 41 XDRAWHTA
D128: C2 48 4F 4D C5 52 4F 54 BHOMEOT
D130: BD 53 43 41 4C 45 BD 53 =SCALE=S
D138: 48 4C 4F 41 C4 54 52 41 HLOADTRA
D140: 43 C5 4E 4F 54 52 41 43 CENOTRAC
D148: C5 4E 4F 52 4D 41 CC 49 ENORMALI
D150: 4E 56 45 52 53 C5 46 4C NVERSEFL
D158: 41 53 C8 43 4F 4C 4F 52 ASHCOLOR
D160: BD 50 4F D0 56 54 41 C2 =POPV TAB
D168: 48 49 4D 45 4D BA 4C 4F HIMEM:LO
D170: 4D 45 4D BA 4F 4E 45 52 MEM:ONER
D178: D2 52 45 53 55 4D C5 52 RRESUMER
D180: 45 43 41 4C CC 53 54 4F ECALLSTO
D188: 52 C5 53 50 45 45 44 BD RESPEED=
D190: 4C 45 D4 47 4F 54 CF 52 LETGOTOR
D198: 53 CE 49 C6 52 45 53 54 UNIFREST
D1A0: 4F 52 C5 A6 47 4F 53 55 ORE&GOSU
D1A8: C2 52 45 54 55 52 CE 52 BRETURNR
D1B0: 45 CD 53 54 4F D0 4F CE EMSTOPON
D1B8: 57 41 49 D4 4C 4F 41 C4 WAITLOAD
D1C0: 53 41 56 C5 44 45 C6 50 SAVEDEFP
D1C8: 4F 4B C5 50 52 49 4E D4 OKEPRINT
D1D0: 43 4F 4E D4 4C 49 53 D4 CONTRLIST
D1D8: 43 4C 45 41 D2 47 45 D4 CLEARGET
D1E0: 4E 45 D7 54 41 42 AB 54 NEWTAB(T
D1E8: CF 46 CE 53 50 43 AB 54 OFNSPC(T
D1F0: 48 45 CE 41 D4 4E 4F D4 HENATNOT
D1F8: 53 54 45 D0 AB AD AA AF STEP+~/*
```

* 3D0G

Listing 2. Sample output of Apple Page Dump. The first line sets up the zero page pointer to the page that is to be displayed. The following lines display the contents of that page (D1). The 3D0G exits back to Applesoft/DOS.

Since an entire page of memory cannot be displayed on the standard Apple text display (40 columns by 24 rows), Apple Page Dump displays a half-page (128 bytes) at a time. After the first half-page is displayed, you may select one of two options:

- 1) Press the space bar to display the next 128 bytes.
- 2) Press the escape key to terminate the listing.

In summary, Apple Page Dump is a short (102 bytes), relocatable, easy-to-use routine that enhances the already powerful Apple Monitor. ■

```
LOAD 6502 ROUTINE
100 PRINT CHR$(4);"BLOAD APPLE
PAGE DUMP"
109 REM
```

```
MAIN PROGRAM
110 HOME
120 INPUT "ENTER PAGE # TO DISPL
AY (0-255): ";PN#
130 IF PN# = "" THEN END
140 PG = VAL (PN#): IF PG < 0 OR
PG > 255 GOTO 120
150 POKE 255,PG
160 CALL 768
170 PRINT : GOTO 120
```

Listing 3. An Applesoft Basic program to load and use Apple Page Dump from Basic instead of the Monitor. Line 100 loads the object code into RAM.

Those Beautiful Exec Subroutines

by Dewey Payne

Along with everyone else who has done any Basic programming, I have favorite subroutines that are used program after program. They are tried and true. They have been debugged. They are brief. In short, they are everything I want for a specific task. For a long time, I was using the Merge portion of the Apple's Renumber program to get these subroutines into my new programs. Then I found a better way!

Each time I build (or find) a useful subroutine, I add it to one of my "subroutine library disks" as an EXEC file and then, anytime I need that particular subroutine, it's handy. Most of the subroutines run only a few lines so I can put a horde of them on one library disk.

To generate the EXEC file as I use it, type the program in the listing and save it on disk as Write E. This two-line program will create a one-line EXEC file named E—one of the most useful I have found. You save the original program (in the Listing) for easy transfer of the E file to other disks. (The POKE 33,33 is not necessary but will make the subroutine EXEC files occupy less disk space.) After you save the Write E program, enter RUN and you will see the E file being built.

Now type NEW and enter:

```
1000 PRINT "MARY HAD A LITTLE  
LAMB.": RETURN
```

This is the subroutine we will use for a demonstration. Now, enter EXEC E. After the disk stops whirring, enter RUN. When asked for a file name, enter MARY 1000 and hit return. Statement 1000 will appear on the screen and the EXEC file Mary 1000 will be recorded on disk.

Enter NEW to clear memory for building our simple demo program. Now enter:


```
10 GOSUB 1000:IF PEEK (49152) = 155  
THEN END  
20 GOTO 10
```

(Statement 10 reads the keyboard and ends if escape has been pressed.) If you try to run the program now, it will bomb with UNDEFINED STATEMENT ERROR IN 10.

Now, enter EXEC MARY 1000 and LIST. You will see that our subroutine has been added in its proper place. When you run it you will see the phrase printed continuously until you press escape, reset or control-C.

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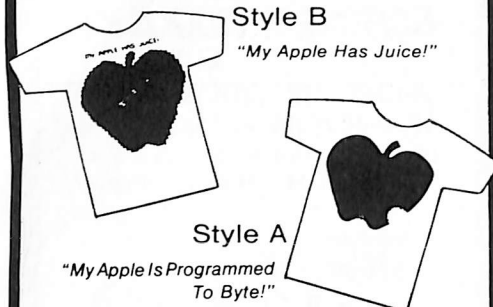
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```
0 D$ = CHR$(4); PRINT D$ "MONCIO";
      POKE 33,33; N$ = "E"; PRINT D$
      "OPEN "N$; PRINT D$
      "WRITE "N$; LIST 1; PRINT
      D$ "CLOSE"; POKE 33,40; END

1 D$ = CHR$(4); PRINT D$
      "MONCIO"; POKE 33,33; IN
      PUT "NAME OF FILE "; N$:
      PRINT D$ "OPEN "N$; PRINT
      D$ "WRITE "N$; LIST 2,63999;
      PRINT D$ "CLOSE"; POKE
      33,40; END
```

Program listing. This two-line program creates a one-line EXEC file for useful subroutines, which then can be saved to a library disk.

I always give a subroutine EXEC a title that includes a name relating to what it does *and* the inclusive statement numbers—DOLLARS & CENTS 40-60 for example. This way, I can be sure of what it does and determine if there will be a conflict in statement numbers between the subroutine and the program receiving it.

Hints 'n' Techniques

If any statement number occurs in both the main program and the EXECed subroutine, that line in the main program will be replaced by the one in the EXECed subroutine. If I need to adjust the statement numbers in a subroutine, I clear memory with NEW, exec the subroutine, adjust the statement numbers as required, exec E and create another EXEC subroutine reflecting the new statement numbers.

Using the above procedure, you can insert most subroutines in a program in less time than it takes to just load Apple's Renumber program. EXEC FILENAME is all it takes.

I have used the E file to insert simple one-line subroutines and to merge sizeable programs. The only limitations are obvious—no statement numbers less than 2 and no statement numbers greater than 63999. ■

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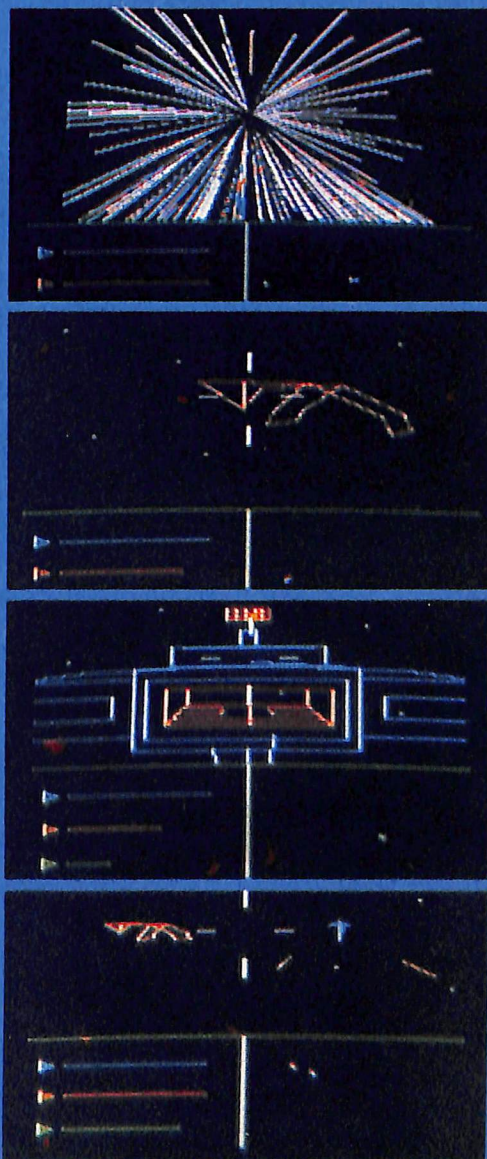
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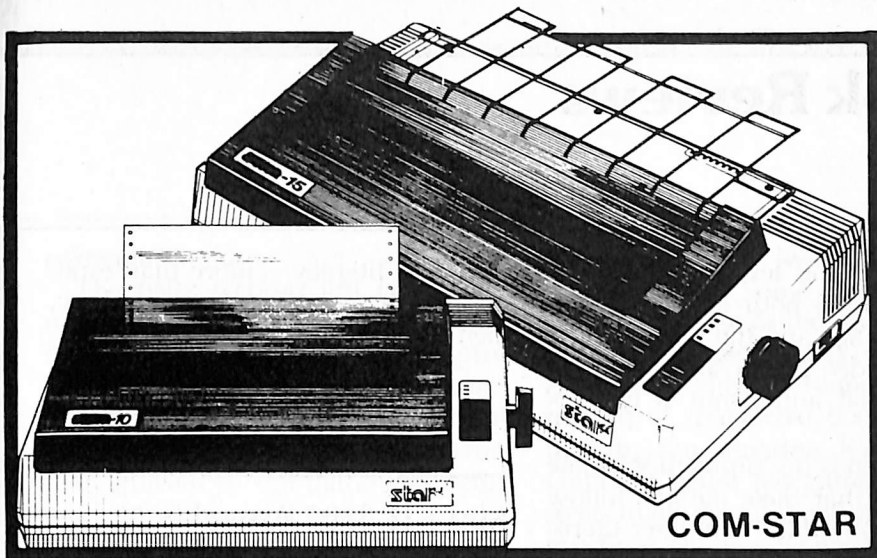


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Book Reviews

Computer Literacy: A Hands-On Approach

by Arthur Luehrmann and
Herbert Peckham

McGraw-Hill
1221 Avenue of the Americas
New York, NY 10020
Softcover, \$17.97

Ten years ago, "computer literacy" was two words separated from each other by a comfortable number of dictionary pages. Today it is a composite term wrestled with by school boards, teachers and authors. In *Computer Literacy: A Hands-On Approach* by Arthur Luehrmann and Herbert Peckham, the author's biography states that Luehrmann was the one who brought these words together in 1972. Those words have been paired long enough for a clear definition to have evolved. The fact that this has not happened is reflected in the book.

I don't want to imply that care was not taken in the preparation of the text. A simple listing in the Acknowledgements of people who participated in the planning and testing of the book would alone fill the space allotted to this review. It was not a local effort; the teachers who participated are listed by state, indicating a broad geographical distribution. In fact, this is not a single book, but a number of different versions produced for different computers—I reviewed the Apple II version along with a teacher's guide, a workbook and a disk of software.

No listing of the appropriate grade level or levels is included, but the size of the print and the involvement of middle school teachers as well as high school teachers in the testing indicates that a broad range of middle and high school usage is anticipated and hoped for by everyone involved.

The layout of the book is attractive with blue boxes used to highlight specific points that the authors feel should be emphasized. The type style is quite readable, reducing any threatening quality a technical book

may have at this level. The authors' writing style is both appropriate to the student age and the material and is well blended into a single voice so that the dual authorship is not apparent.

What then is my problem with the book? It is that these authors follow the philosophy that "computer literacy" equals "programming in Basic on some model of computer." The book is almost exclusively devoted to instructing students in the use of the Apple II or IIe for specific coding operations. Keystrokes are emphasized rather than thinking. Bits of history and information about computers are dropped in as a few phrases or paragraphs between major sections that develop rules for coding.

The instructor's guide is useful to the teacher and represents real understanding of what goes on in a classroom. The disk contains, for the most part, examples of programs that the students can look at, list and modify. They are not interactive, as a rule, but they are general enough and short enough for students to follow and modify. The graphics involved are rather simple lo-res graphics.

I realize many people equate computer literacy with programming and, while I do not personally agree with this, I can see it as a valid approach. But the teaching of programming should start with logical thinking and algorithm development. This book begins with what I consider to be the back end of programming, the coding and the machine specific elements. If the computer changes, as did the Apple II to the Apple IIe, what is the essential and what is the trivial to be taught? In a time when technology is changing so rapidly, one should focus on what remains valid for the students, rather than what depends on the consistency of the manufacturer. All students will not become programmers but they will be users of computers, in a world increasingly involved with these machines.

If you are looking for a book to instruct students in coding Basic for the present models of Apple II or Apple IIe, this is the book. If you feel that

computer literacy is more than exposure to the operation of one machine, then I say look further. ■

Anna Mae Burke
Fort Lauderdale, FL

Apple II 6502 Assembly Language Tutor

by Richard Haskell

Prentice-Hall, Inc.
Box 500
Englewood Cliffs, NJ 07632
Softcover, \$34.95

This book explains 6502 machine language so a person without formal computer education can understand it. A program disk is included to let you try out machine-language programs and see their effects in the same way that you try out simple Basic programs when learning that language.

The monitor program, called Tutor, displays the contents of the stack and all the 6502 registers. It also lets you alter register contents, display and alter memory, and execute machine language programs, either one instruction at a time, or by setting breakpoints. Many other features make this program useful for debugging machine-language programs much larger than the examples given in the book.

To make full use of the Tutor, you might want an assembler. The book explains a little about assemblers, but since there are several assemblers available, it doesn't describe specific ones. It is not necessary to have an assembler to use this book.

The explanations of the Tutor program and the 6502 features are intermixed and generally are easy to separate. The book is (as claimed) a tutorial and therefore not organized as a reference manual. The Tutor appendix lists where each feature is explained and describes a few not covered by the tutorial. The descriptions in the tutorial sections tell you which keys to use to do the examples without explaining how the program works or why you should use those

particular keys.

The 6502 sections are general in nature and use the examples well to illustrate the operation of the processor. To illustrate I/O programming, the book shows designs for a simple analog to digital converter that attaches to the game connector and parallel/serial interfaces for the peripheral I/O slots. While programming these devices is simple, the explanations assume that the reader comprehends the function of an I/O device from a logic diagram and a spec sheet of the chips.

The keyboard, display, paddles and speaker I/O are also described. An explanation of disk I/O would have required expansion of the book.

Overall, the book gives a good description of the 6502 processor in the Apple II. The additional feature of the program disk makes it easy to try out (or debug) both the examples in the book and your own programs. If you build one of the I/O devices described, or design and build your own, the information is particularly useful. ■

Hub Seward
Milford, NH

Fancy Programming in Applesoft

by **Gabriel Cuellar**

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Softcover, \$14.95

Consider those forgotten souls among the Applesoft programmers, the "upper intermediates." They've passed *The Applesoft Tutorial*, but they're still no threat to the head Beagle, Bert Kersey. They can write a Basic structured program, but they can't make it look or sound quite as professional as they would like. Where do they go for help?

Up until now the answer has been that they go scrounging. The information needed for making fundamentally sound programs more polished, more effective and more secure

has indeed been available; but it's been scattered. Some is found in the pooled expertise at user groups; some is found in newsletters and magazines; and some is found among a myriad of specialized books. At last, though, the situation has changed. Gabriel Cuellar has gathered the answers to all the most commonly asked questions of the advanced intermediate programmers into one source: *Fancy Programming in Applesoft*.

Attractive

This is one book you can tell by its cover; it's called *Fancy Programming*, and it comes in a fancy package. The striking blue cover, featuring decorated type and a golden apple served up on a silver platter, is quite appropriate. The layout and design are gentle on the eye and the type is large and easy-to-read. Admittedly, program listings have been photographed directly from a print-out, which isn't quite as attractive as typesetting. On the other hand, it does assure the reader that inadvertent errors haven't crept in during the production process.

Easy to Use

The book is packed with information, which is well organized and easily accessible. The basic structure moves from fundamental input and output considerations on through text files (sequential and random plus sorting algorithms), display options (text and low- and high-resolution graphics), and sound generation. It ends with a variety of useful utilities.

To help the reader find a way through this wealth of information, Cuellar has provided a list of the routines included (eighty-four of them), a solid index, and a truly comprehensive table of contents. This last is important because the book is the sort that is more likely to be used as a handbook than for consecutive reading.

Packed with Information

One of the features I appreciated most was that the author not only tells you how to do something, he also shows you why. Thus, chapter 1 ex-

plains the results arising from inappropriate input (e.g., inaccurate results or even crashes) and then shows a variety of ways to filter what's typed so that only the right data gets through. Chapter 3 describes seven or eight different sorting techniques, but also explains why the shell sort is best for the size of data collection dealt with on the Apple.

There is hardly a spare word in the book. From first to last, it is packed with exactly the kind of information a programmer would want. For example, chapter 5 shows several new uses for Exec files; chapter 7 shows ways to print the text screen, access the second page of text or implement a help file; chapter 9 shows ways to create and use shape tables (including animation), to combine pages 1 and 2 of hi-res graphics, and to emulate a text display of up to 70 by 32 characters.

Summary

This is exactly the kind of book I wish I had owned when I first began serious programming in Basic. If I were to quibble, I would wish for a little more thorough explanation of some of the techniques that are presented. However, I recognize that a trade-off is involved here and the author opted for breadth rather than depth in his treatment. This is a book that ought to be in the library of every Applesoft programmer. ■

Wayne Dickson
DeLand, FL

Assembly Language Programming for the Apple II

by **Robert Mottola**

Osborne/McGraw-Hill
630 Bancroft Way
Berkeley, CA 94710
Softcover, \$12.95

The mention of assembly-language programming can make many aspiring programmers skip a clock cycle. Most newcomers view this type of programming as a form of self-punishment only for the strong of

heart and large of paunch. But there are some (like me) that don't know the meaning of fear and charge ahead, scattering bits and bytes hither and yon, trying to make that blasted assembler behave.

Robert Mottola has put together a straightforward tutorial on the basics of assembly-language programming for the beginner. If you know how to feel your way around a Basic program, you can follow this book. He uses short Basic programs to illustrate assembly-language functions.

This book is *not* a reference book on 6502 routines. It is written to help you learn *what* assembly language is and *how* to write programs yourself.

First, to program in assembly you need some knowledge of binary and hexadecimal number systems. The author gives a good short explanation of these systems.

An explanation of what an assem-

bler is and why we use them is next. Terms like source code, object code, label, mnemonic and operand are explained well. The book uses the Lisa assembler from On-Line Systems as an example. An appendix explains the differences between a number of popular assemblers.

In an easy-to-read manner the author walks you through a session of entering and editing your source code, assembling and debugging the code, and saving the object code. The example shown is used with a Basic program to show you how to hook the two types of programs together.

Once you have made it this far in the book, you have learned the mechanics of assembly-language programming. You begin to think that "it ain't so tough after all!"

But the author doesn't let you slow down. You charge right into arithmetic operations like addition and

subtraction. Did you know your Apple's brain can only add? To subtract it adds backwards. Mr. Mottola will help you understand this procedure.

Branching and looping are compared to their Basic counterparts of IF-THEN and FOR-NEXT. Now you get to some fun stuff like a little graphics, addressing modes, flags, logic functions, using the stack and more. There is even a short appendix on what 6502 instructions are not covered in the book.

When you finish the book, Mr. Mottola doesn't just let you flounder off on your own. There is a list of publications, books, clubs and so forth where you can get more information. The list is a little out of date but can get you started. Last, but not least, there is a summary of the 6502 instruction set and a fair index to help you find things you forget.

The book is written for the begin-

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ner. It is not intended to be a reference book for the 6502, but is a tutorial on how to program in assembly language. It is a book I would recommend the first time you use an assembler. It gives you step-by-step lessons that no assembler manual can offer. ■

Lee E. Sumner, Jr.
Dallastown, PA

Megabucks From Your Microcomputer

by Timothy Orr Knight

Howard W. Sams & Co.
4300 West 62nd St.
Indianapolis, IN 46268
Softcover, \$3.95

Knocking this 17-year-old author is a dirty job, but someone's got to do it.

A self-proclaimed "whiz kid," Timothy Orr Knight has written numerous software reviews, a book about modems (reviewed in November's *inCider*) and several computer game programs. Though Knight presently is proud of himself, there will come a day when *Megabucks From Your Microcomputer* will embarrass him.

Disregard the title: Knight spends half his time explaining how to write for computer magazines. He postulates that after building a portfolio of reviews and articles, you should know enough about computers to either (1) write software for profit, (2) open your own computer store, (3) be a microcomputer consultant, (4) market computer "novelty items" like T-shirts and bumper stickers, or (5) write your own book. But curiously, Knight offers no comprehensive plan for accomplishing any of these objectives.

Knight should have underscored his belief in writing reviews with an exhaustive list of computer publications, including addresses, phone numbers and author pay rates. Instead, Knight plugs only the seven magazines that have printed his

work. He fails to distinguish between machine-specific and general interest magazines, and between technical and non-technical editorial styles. Worst of all, Knight fails to remind budding authors that they first should know the basics of good writing—any kind of writing—before they submit even one manuscript.

On three occasions Knight writes of our "outspoken" publisher Wayne Green, but doesn't reveal why Green deserves the label. Knight hails our sister publication *80 Micro* as a magazine "of ever increasing bulk." And astonishingly, Knight tells of a fellow "whiz kid" being interviewed by "*Newsweek*, the *NBC Nightly News*, the *National Enquirer* and many other fine publications."

Eventually Knight asserts that game concepts must be unusual in order to outflank the competition, and must make the best use of a com-

puter's memory and graphics capabilities. Knight advises prospective software writers to sell their programs to reputable software companies for no less than a 20 percent royalty rate, and drops the names of companies worth contacting (but again, only those that he happens to know about).

Rather than interviewing professionals in publishing and marketing or computerists with success stories of their own, this greenhorn author prefers to write whatever comes into his head—and he admits it! "If you want to know the truth about it," Knight writes in the final chapter, "this book you are reading took me no more than 20 hours of solid work to write."

It shows. ■

Sam Whitmore
inCider Staff

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Software Reviews

Bookends

One of the most time consuming tasks in research is the maintenance of a file of references and the production of bibliographies from that file. For this purpose, even the simplest of database management systems has a potential advantage over 3 by 5 file cards.

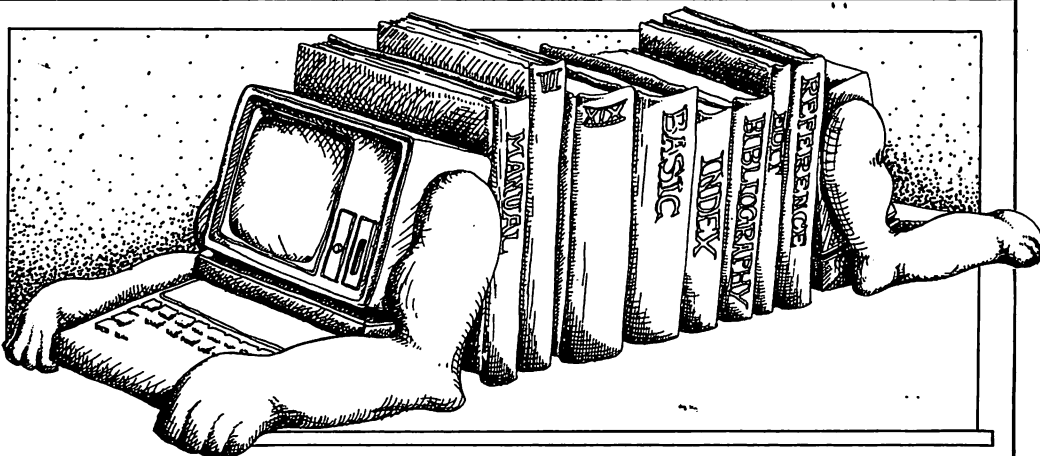
The more sophisticated systems can provide almost instantaneous access to a given reference by a wide variety of criteria. However, all of that sorting and searching power is much less useful if the references can't be printed in any one of the numerous formats required by professional journals.

An ideal program would permit the easy entry and editing of references and keywords, the rapid selection of the appropriate citation and the printing of a bibliography in a form that is suitable for publication in any of a number of journals.

Bookends, a program published by Sensible Software, delivers all of the above. I have used this program extensively, and it is superior to more general database management systems for the preparation of references for publication.

When the disk is booted, the program automatically checks for 48K or 64K of memory (64K provides about 40 percent more workspace) and loads the appropriate version. It can be used with lowercase display, shift-key modification, or lowercase keyboard, although none of these are necessary. These options can be modified from the menu on the initial screen, which also allows you to create a data disk, specify printer options, obtain descriptions of the various functions of the program or run the main program.

Once in the main program, you can load in a reference list, add a reference or search for references. When you choose to add a reference, the number of the next reference in the file is displayed (#1 if no reference list has been loaded), and you are prompted to type in the names of



the authors. After return is pressed, a prompt for the journal title appears. Prompts then appear for the volume, pages, date, publisher, keywords, abstract and classification.

All of these categories are optional, and the program will accept an entry that has information in any or all of the categories. Each category will take a maximum of 255 characters, except for abstract, which will take 740. Once the entry is completed, there is an option to edit the reference. When E is pressed, the categories appear, one at a time, for editing. The simple functions that are available for editing make the process a pleasure. Control-S, or shift, if you have the shift-key modification, gives capitals. Control-A gives caps lock, control-B moves the cursor to the beginning of the category and control-E moves it to the end. Control-D deletes a letter, control-I allows insertion of any number of letters, control-F allows you to find the occurrence of any word in the category and carriage return moves to the next category, no matter where the cursor is. When the entry is satisfactory, the space bar allows the next reference to be input.

After the references have been entered, they can be saved to disk for later use, printed to the screen or printer, added to or searched by reference number or content. If you choose to search for references, you are given the option of searching through the author, keyword and title categories, through every category in the entire database (universal search) or for any combination of let-

ters, numbers or symbols up to 128 characters. The ability to search for multiple keywords is accomplished by keying in each word followed by a slash. The program then permits you to find the references that contain any one of the keywords, or only those references that contain all of the keywords.

Since the entire database is held in memory, the search itself is fast. For example, a database that contains 140 references can be searched in less than five seconds by any of the criteria listed. For references that have no abstract included, the memory in a 64K machine will permit between 200 and 225 entries. If the bibliography is too large to be held in memory, files can be chained in printing and searching. Sensible Software estimates that up to 900 references can be stored on a disk. The total number of references that can be stored will, of course, be reduced if complete abstracts are included.

To this point, the program acts very much like any high quality database management program. However, the most important aspect of this program is its ability to format references. Up to four reference formats can be held in memory, with the option of loading others, and any or all of these formats can be used to print a bibliography.

In a typical reference format, the first few inputs determine the name order (i.e., last name first) of the first and subsequent authors, and the punctuation after each name. Classification refers to the source of the article (I use j for jour-

nal, b for book, as suggested in the manual), and Order is the format of the reference. In this case, a + means that the authors will be printed first, with "and" before the last name; (space) t. means that there is a space between the authors and the title, which is followed by a period; j. means the journal title followed by a period; (d) is the date in parentheses; and v:p- indicates the volume number followed by a colon and the pages included in the article.

It is also possible to enter control characters for your printer at any spot in this order. The classification system comes into play when the journal requires different reference formats for books and journals. For example, references from a book require the name of the publisher in addition to the requirements for a journal reference. The program will provide the appropriate format depending on the classification that the reference has been given. After the references and formats have been chosen, the entire bibliography can be printed from within the program, or the formatted references can be transferred to your word processor as either a text or binary file.

The program has a number of other features that are useful. These include the ability to alphabetize and save any reference list by author, title or keyword; the use of wildcards in the search; and the ability to list all authors or keywords from a reference list in alphabetical order.

The feature that is potentially the most useful of all comes with another program, Med-Trans. Med-Trans permits the conversion of text files from a Medline search directly into Bookends files. This means that complete references, including abstracts, can be added to the file automatically and modified to your specifications. A program that will convert files obtained from the Dialog database service is currently under development.

As with all products from Sensible Software, the human engineering of Bookends is excellent. Since I haven't been able to disrupt the operation of

the program, even by hitting reset, I must conclude that it is foolproof. Every option is selected from a menu using a single key, and if you press an inappropriate key, the program just ignores it. Pressing the escape key will bring you back to the last menu screen at any time. You can't overwrite anything in memory without being warned. In addition, there are help options for every menu, and there is a clearly written 91-page manual that presents a number of examples for each option along with a complete table of contents and a four-page index.

The program is supplied along with a backup on two copy-protected disks that run on the Apple II Plus, IIe and III (in emulation mode).

Sensible Software is located at 6619 Perham Drive, West Bloomfield, MI 48033. Bookends costs \$125. ■

Richard Fertel
Columbus, OH

The Prime Plotter

The Prime Plotter is a prime example of a program that lets you do simple plots as well as the most complex graphics imaginable. But there is a tradeoff for its power: it's not an easy system to learn. Once you get the hang of it, though, the package allows almost unlimited flexibility.

The difficulty is partly due to the 212-page (plus appendices) manual and partly due to the fact that the tutorial makes up only ten percent of that manual. I'm used to simpler systems where I just enter information and the program creates pictures of the data, complete with automatic scaling and fixed titles. The Prime Plotter (version 1.1) is designed differently—you tell it what scale to use; you put the titles where you want them; and you determine how many graphs you'd like to plot. To use it you need a 64K Apple II Plus or a IIe. If you have a Grappler or

PKASO interface card, you can print directly from the Prime Plotter. If you don't have one of these cards, the images you create can be accessed and printed by separate hard-copy printing programs.

The system can keep track of data (save and load it from disk) and can also perform statistical functions on your information. It can draw graphs, of course, and it includes an interesting Replay function that actually redraws pictures line by line.

From a programming standpoint, you can save images in DIF (Data Interchange Format) files; the data can be shared with other programs (like VisiCalc) or in a special compressed mode, which takes up only about ten percent of the disk space required to store a picture. The Prime Plotter is a menu-driven system that works in conjunction with a command line. You can instantly toggle between any menu and the graphics display. The menu structure follows the complex line of the program itself; the basic system flowchart is shown in Figure 1. While it looks complicated at first glance, you'll note that every function flows logically.

The program is modular—you move from one module (say, the X,Y plotting area that draws line, dashed-line, scatter, bar or area charts) to another module (say the section you use to create pie charts). This allows for the future addition of other modules that will, for instance, let you work in 3-D images. Since the package has been released, the program's manufacturer, PrimeSoft, has added the capability to use a plotter to draw your graphs in color. You can put a frame around your graphs instantly if you wish, and the system even lets you plot more than one type of graph on the same screen.

Along with all this power and flexibility comes a certain degree of difficulty; you cannot skim through the manual and then create instant pictures. Quite a few things must be specified before you can make a graph.

For example, you must specify the type of plot, the color(s), the max-

THE PRIME PLOTTER MENU STRUCTURE

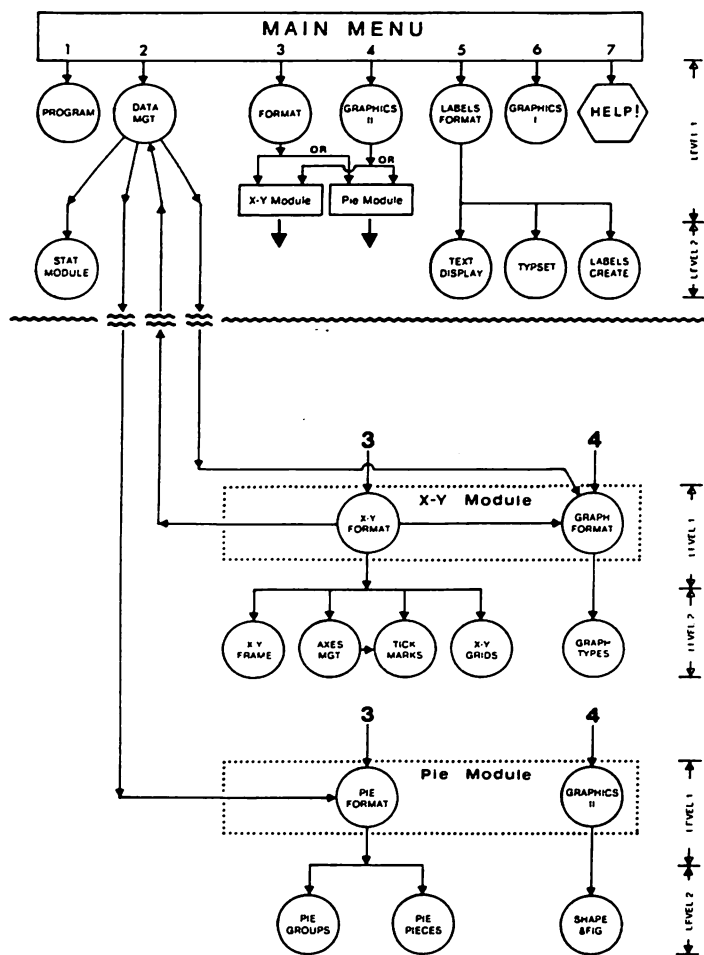


Figure 1. A flowchart of the Prime Plotter's basic functions.

imum number of data points, where the tick marks should be and what size and shape you'd like them, if you want a grid on the picture, if you want the image framed and how wide that frame should be (sizes 1-15) and the scale and location of the plotting line. Your pie or bar charts can be plain or filled with different designs, and you even have a 3-D type of fill available to give them an illusion of depth. It's not a speedy process; but the more you work with it, the faster you become.

Unfortunately, only part of the manual is a tutorial. And even the tutorial section doesn't explain things as well as it could—it leads you through the examples but doesn't cover each step along the way.

The system does come with a quick-reference card, and there's on-screen help available for all functions. The Help list is complete; it alone takes up

the whole screen when you ask for help.

You can enter up to three of your own formulas or functions and have them work on data in much the same way you define a function for a Basic program. For example, you could instruct the Prime Plotter to calculate the sum of all the numbers in a data set and give each value its proper percentage. You could then graph by percentages, rather than on the raw data.

When you enter your information, you do so in a structure similar to Basic—the system creates data lines for you automatically. The more plotting points you want to use, the fewer data sets you can work with. However, data sets can be linked together for use on your pictures. Once you get started, it's easy to add or change information. You can work with game paddles or a joystick or the

keyboard in a free-draw mode.

The pie chart module lets you have up to 18 slices in each pie, and you can fill them with different designs and/or have a detached slice or section to emphasize something.

The Prime Plotter also has a full text-making capability, so you can put titles or other explanatory data on your pictures in about any size and position you wish. If you want to label your tick marks, you can even tell the program what format you want to use—integers, dollars and cents, and so on.

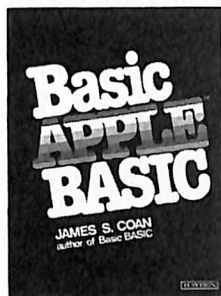
Finally, the program includes some powerful statistical functions. You can average and smooth your information, find the mean and standard deviation or discover the average growth rate of a data set.

While the Prime Plotter is powerful and flexible, the system isn't perfect for everyone. You get a little relief with its menu structure, but even they are written in sort of a cryptic code to save screen space. Again, it's a matter of using the system. The package is also slow to load—it takes about 30 seconds to bring up the main menu and nearly that amount of time to get to the data entry part.

The only major weakness I could find is in the plotting routine itself. Each time you plot some of your data, the line (or pie section, or bar or whatever) is shown on your screen and you are asked to verify if you wish to keep it on the graph you're creating. That's good. But if you indicate you don't want to keep the line (or whatever you just plotted), the system, and any other line that's under the figure you wish to remove, is erased.

What's the bottom line? If you use complex graphics in your work, the Prime Plotter may be perfect for you. The manual would be better if it were all a tutorial, and although it doesn't have an index, it does include a detailed eight-page table of contents. If all you do are simple graphs, there are other packages available for your Apple that are much easier than this one. On the flip side of the coin,

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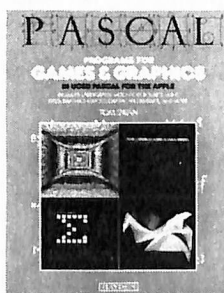
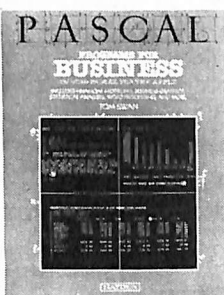


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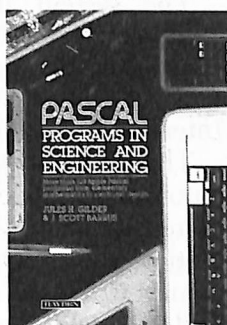
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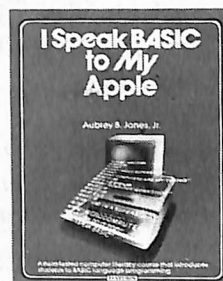
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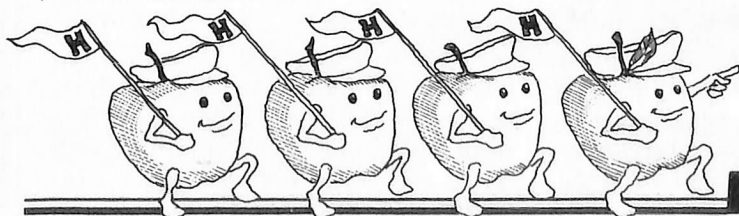
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if your work requires truly complex pictures along with statistical power to work with your data, the Prime Plotter is, well, a prime candidate for your business. The \$240 program is available from PrimeSoft Corporation, PO Box 40, Cabin John, MD 20818. ■

Greg Glau
Prescott, AZ

Editor's note: According to Primesoft, a revised manual is now sold with the Prime Plotter.

The Data Bank

Data Bank is an inexpensive but powerful information handling package that you can describe in one word: friendly. The system is written mostly in Applesoft, so you have the opportunity to get inside the programs and change them to suit your own needs. Surprisingly, even with the limitations of Basic programming, the system is fairly fast.

The Data Bank brings you most of the features you need in a file handling program. You can have up to 100 fields per file, with as many as 238 characters per field. You can change field sizes and locations *after* you've entered data into them. If you want to shorten a field, the system has a module that will examine what records you already have and let you know how much you can shorten things before you start to truncate your existing data.

There's the usual assortment of search functions that you can call in to play for either a screen search or when you want a hard copy of your information. All search parameters use basically a wild-card approach: If you ask to look in, say, the last name field for FIELDS, the system will find FIELDS and FIELDS-TOWN. You have the option to print records that either fit or don't fit your search pattern. You can search on more than one field at a time, and while you can have either an And search or an Or search, you cannot combine the two.

You can ask The Data Bank to

look through all of your entries, or only a section of them. The system can examine your numerical entries on a greater-or-less-than basis. Each field can have a calculation formula that lets you do math between fields and transfer the results (if you wish) into another field. You can, of course, change any or all of your data once it's saved.

The system includes a unique VisiCalc interface that lets you put data directly into VisiCalc files without converting them into Data Interchange Format (DIF) files.

The system features a not-quite automatic update feature that's not quite true. First you enter the information to update all records and then you use the search function to find the fields you wish to update. When each is displayed on your screen, you manually indicate whether you wish to have this record updated or not.

The Data Bank requires a 48K Apple II (or IIe) and at least one disk drive. Two drives make the system a bit faster to operate. The package is completely menu-driven and therefore is very easy to use. The 140-page manual gives you a helpful blend of reference and tutorial material and it also provides numerous screen samples. The software is not copy protected.

Printed reports can be formatted two ways. The first is what you'd expect—a columnar type of thing that puts your field names at the top and their respective data below. The system will automatically tell your Epson to go to its compressed-character mode if a report gets wider than the normal 80-column size. (The Data Bank is designed to work with Epson printers; if you have a different make of printer there's a place to enter the proper control codes for it, and the program will save them on disk to use as needed.)

The other format lets you design your own reports. The system allows you to specify the line and tab locations on your paper for each item you want to print. This is terrific for mailing labels or invoices or what-

ever special output forms you need. Unfortunately, the system doesn't check your page coordinates to verify that the locations you give are *on* the paper; if you botch your instructions to the program, you can get an awfully weird printout.

I had a problem with the printing area of the package. My Epson MX-80 F/T lives in slot 2 inside my Apple, and when I requested a printout, I got the data on paper but the program kept looking for more information on disk. The only way to stop it was to press reset. The people who make The Data Bank assure me that this problem will be corrected.

The Data Bank isn't perfect, of course. Nowhere in the documentation is it mentioned how much information you can keep track of. The system does give you a running record of how many characters each file uses, and the disk catalog shows you how many free sectors are available. But you still have the calculations to manually figure out.

Data-input checking capability is not available, so you can enter anything into any field, up to the length specified. If you have one field that you want to be all numeric or in a specific format, there's no way to instruct the system to accept only that sort of entry. You're also allowed to have more than one field with the same name. In the business world, this can create a problem for inexperienced data entry operators.

The program also disables the Initialize function. While you can use COPYA to copy the disks that come with the package, once The Data Bank is in use, you must use the FID program to make duplicates (or else reboot).

While The Data Bank is generally user friendly and always tells you what it's doing, there are cases where the error information it gives is confusing. For instance, if you have a data disk in the drive when the system expects the program disk, the system flashes ERROR CODE 6. If you twice insist that you have the right disk in (and you don't), it will try to reboot. RESET stops all opera-

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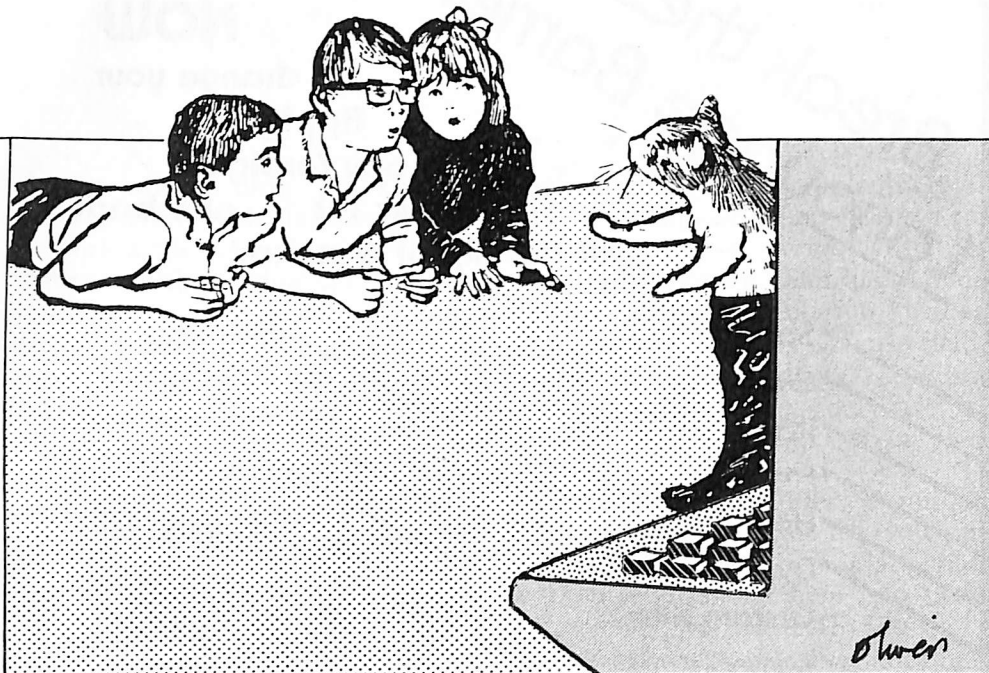
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tions because The Data Bank is basically a series of Applesoft programs and so the user is allowed entry to them at any time.

Finally, there's no way to format your screen. You simply see a list of each field, rather than any sort of design that would be helpful to you or the people who'll operate the system. When you enter data you go through each field sequentially, whether you have data to enter into them or not. And there's no merging capability, although you can remove *selected* records from an existing file and put them into a new file.

In truth, these complaints are minor and are bothersome only if you absolutely must have this or that particular function. The friendliness of the package makes up for a lot of little limitations.

The \$170 program is available from FlowerSoft, 564 Tara, Manteca, CA 95336. There's also an \$89.95 version of the package which includes just the database part of the system and none of the report printing routines. It gives you basically an on-screen file handling system. ■

Greg Glau
Prescott, AZ

Young Folks Series

Good software for a child under the age of eight is difficult to

find. As teacher and computer consultant in an elementary school, I have found that it is difficult to encourage primary level teachers to use the computer in their classrooms. The teachers have voiced valid concerns over the lack of appropriate programs for their six- and seven-year-old students. I was, therefore, pleased to learn that Island Software has released its Young Folks Series, designed especially for preschool, kindergarten and primary grade students.

The Young Folks Series comes as a package with four disks. The first disk, called Puss In Boot, is designed to teach fourteen different positional concepts. These concepts (such as off, on, over, under, above, below, in and so on) are chosen randomly by the computer. The child sees a picture of a cat named Puss positioned somewhere around his pink boot, which is almost as big as Puss himself. The child then reads or is read two sentences and is asked which sentence correctly describes the picture.

If the child chooses the right answer, the correct word appears in inverse and a pleasant beep is sounded. An incorrect response yields a low-toned beep. Unfortunately, the program does not repeat the example so that the child may correct his or her error.

At any time during the course of the program, a summary of the child's performance may be obtained by pressing S. This sort of informa-

tion lends itself well to diagnostic teaching in the classroom.

The children who worked with the program enjoyed the color graphics. They were particularly amused when Puss was seen in an awkward position, such as below his boot. Since the program involves little typing, it is appropriate for the very young.

The next program, entitled Word Factory, is designed to help students who are having difficulty with letter and number reversals. The child controls a word machine that sends out letters to be assembled into a word on the top section of the screen. When a word is formed, it starts to fall, as if it were coming off an assembly line. The word may fall in either the good or the bad bin. The child must compare the assembled word with the model word and then press the < key to send it to the good column, or the > key for the bad column. The Factory keeps operating until the good box is filled with five good words, or until five good words have mistakenly fallen into the bad box.

The authors claim that about half of the words made at the Factory are correct. The incorrect ones are either words in which all letters are correct, but incorrectly sequenced, or words in which one letter has been replaced by frequently confused letters such as b and d.

The program has two options at the beginning. One allows the teacher to set the length of the model word anywhere from three to six letters. The other option allows the teacher to input his or her own word to use as the factory's model word. Naturally, this second feature would be valuable for individualizing within a classroom setting and particularly for helping learning-disabled children.

The action in this program appealed to the children very much. One major drawback, however, was the length of time it took to complete the game; five to seven minutes are required to play the game using just one model word. Students found it tedious after the first few minutes.

The third disk in the series, Letter Games, is designed to teach letter dis-

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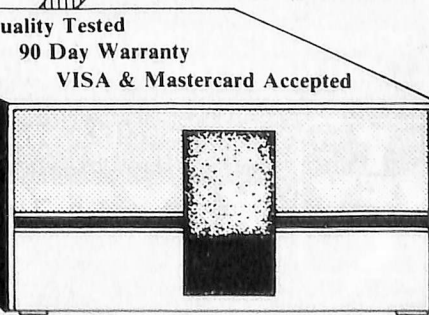
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crimination. There are three different games included on this disk.

In the first game, four letters are presented on the screen. The child selects the letter that is different from all the others. He or she need only type the number (1-4) which appears under each letter.

The second game presents one letter on the left side of a line. The child must select the matching letter from a row of four choices on the right side. The third game is similar to the second except that the four choices on the right side are all different from each other.

Reinforcement for this program also is simple and pleasant. A smiling face appears under a correct answer and a frowning face appears beneath an incorrect response. Unfortunately, this program does not repeat the incorrect example to give the child

another chance.

Pressing S gives a summary of the user's progress on all the letter pairs. The authors chose 20 appropriate letter pairs that are frequently confused by five- to seven-year-olds and by learning-disabled students (b/d, n/u, p/q). For children who do not have problems learning, these three games will probably become too simple by the midpoint of first grade.

The fourth disk in the package, Milk Bottles, is designed to teach young children quantitative concepts. The following eight concepts are covered—most, least, none, almost full, almost empty, half full and different.

The game begins with four empty milk bottles that are shown on the screen. The child watches milk of varying amounts pour into each bottle. The program then asks: "Which

one is half full?" The child types in the number (1 to 4) of the correct bottle and must type A for another question or Q to quit. Pressing Q gives a listing of all the concepts and the number of times that each was answered correctly or incorrectly.

The Young Folks Series has some very good features that are definitely helpful to a teacher. One is the analysis option on three of the disks. This gives a teacher precise information on the child's strengths and weaknesses. Another valuable feature is the list of possible follow-up activities found in the documentation from Island Software. Their teaching suggestions are of a hands-on nature.

The price for each of the four disks is \$25. You may order them from Island Software, Box 300 Dept. E-16, Lake Grove, NY 11755. ■

Janet O'Neil
Nashua, NH

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Planetmaster

Science fiction fiends, along with those interested in conservation, will enjoy Planetmaster, an adventure game for players 13-years-old and up. It is based on the premise that many alien species are close to extinction and must be preserved.

You are in charge of a sanctuary satellite. You try to keep six species' populations alive and flourishing. The length of time and the level of skill required vary, and they depend upon choices made by the player. The species vary in type (herbivore, carnivore, omnivore), size, adaptability to changing environments and class (warm blooded or cold blooded). The dodecahedron-shaped satellite has 12 zones in which you can place the creatures. Lifespans, diet efficiency, reproductive rates and predator-prey relationships determine what happens to each species for the amount of time chosen by the player. The creatures can be moved from one zone to another, and the player must also

keep track of the plants which are necessary to maintain the food chain. This is a game that requires concentration.

After you have made the appropriate choices, the computer decides the outcome of the present arrangement and reports what has happened. Then you can make changes to try to remedy problems and improve situations. If you are successful, the population grows and prospers. If you make the wrong choices, animals may become extinct.

Planetmaster uses high-resolution graphics to draw two views of the head of each animal before you choose which to teleport to the satellite. A display of the plan of the satellite is also available for viewing.

The disk is accompanied by a 24-page booklet that contains instructions for playing, modifying and copying the modules of the game. It contains detailed descriptions of each element of the game, along with diagrams of satellite geography, vegetation needs, food chain and climate zones. Charts show plant growth characteristics as well as zone characteristics.

The disk runs well, although there is a lengthy pause for teleportation of the species to the satellite (while files are being transferred and rewritten).

Planetmaster is an ecological simulation game that will challenge the most sophisticated game players. At the same time, the first levels of play allow a satisfying conclusion for older children.

Planetmaster can be run on an Apple II Plus or Apple IIe computer with 48K RAM and one disk drive using DOS 3.3. The disk can be copied and listed. Instructions are given for some modifications, such as placing the display of animals' characteristics before the choice of the species you want to work with in your preserve.

Planetmaster is available for purchase at local software dealers and from Magnetic Harvest, PO Box 255, Hopkins, SC 29061. The suggested retail price is \$24.95. ■

Janet Meizel
Davis, CA

"The zoom feature makes it possible to print any portion of the screen in full size."

Print Graphics

Graphics have become an accepted part of much Apple software. This was not always the case, and many microcomputers still have only limited graphics capability. The Apple's are as good as any. What you need is a program that will make it possible to obtain hard copy of your graphs and pictures with available printers.

If you have a dot matrix printer with graphics, you are in business. All that's required then is a good program to dump your hi-res screens to a printer. Two such programs are Zoom Graftix and Image Printer.

Both programs work well, but there are differences. Image Printer is programmed for the Epson MX series of printers. It also works with the Epson FX-80 and the NEC PC-8023A dot matrix printer.

The program comes ready to run if you have the Epson parallel interface, and it can be reconfigured for most other cards. The program is exceptionally user friendly. While the 17-page manual explains every one of the features in some detail, you can almost get by without the documentation.

On the other hand, Zoom Graftix works with almost any printer and interface card combination. There are over 1000 combinations of printers and interface cards available. When you boot Zoom Graftix for the first time, it is necessary to configure it to your system. Once your combination of printer and card gives the desired results, save the setup. You still have to determine all the dimensions of the desired printout.

Most of the choices for dumping your graph or picture drawings are the same with both programs. You can center, right or left justify the print or turn it on its side. If you are not satisfied, you get a chance to preview printout on the monitor and make changes. Print in normal or inverse mode.

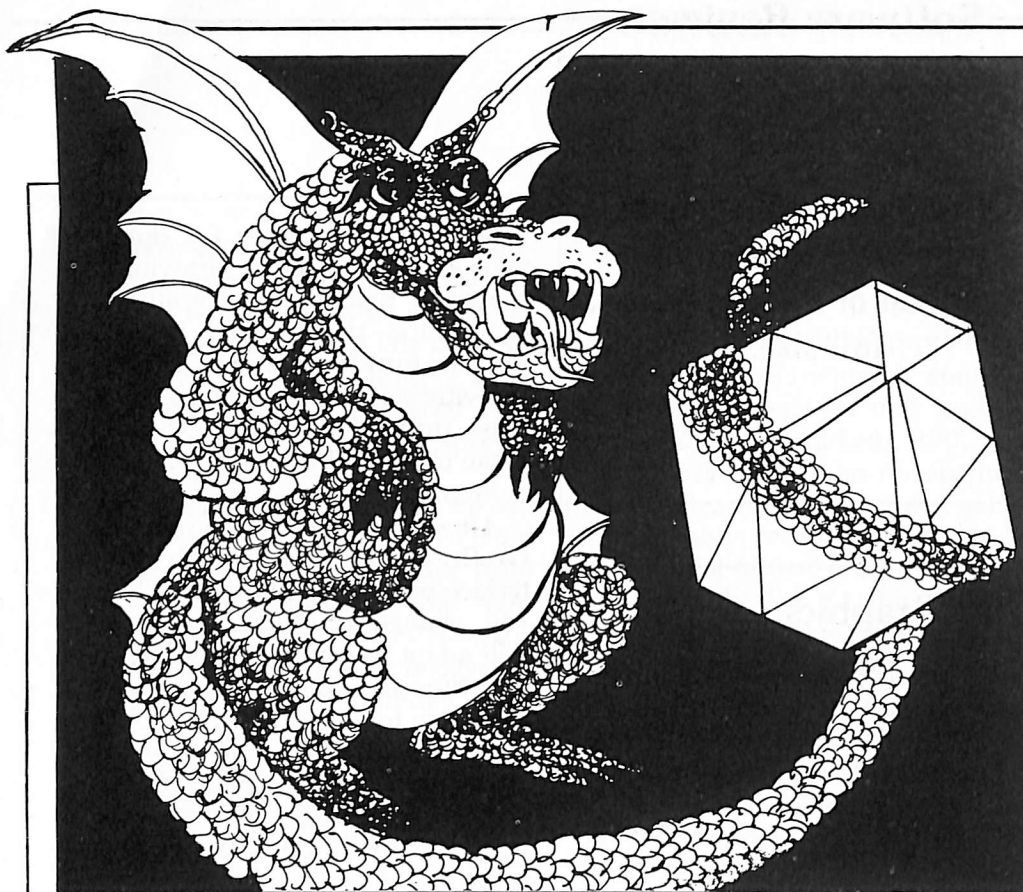
After you have configured Zoom Graftix, it will perform with your interface/printer combination. Should you change printers, the program will adapt to new combinations. The next time you boot the program, you are ready to load and print a picture. Only one disk drive is supported. When you load a previously saved picture, the program first looks at page 1 of the hi-res screen. You may swap to the second screen, if conditions warrant.

The zoom feature makes it possible to print any portion of the screen in full size. You should remember, however, that the limitations of Apple's graphics (this would apply to any other computer) quickly defeat the advantage of very large magnification.

Image Printer solves the problem of different size prints in another way. You have the choice of printing single, double and triple sized pictures. Instead of zooming, you pick opposite corners of part of a picture, if you want it enlarged. This might sound complicated, but it simply requires moving a cursor around the screen to the desired coordinates. Then type P for print. You can also compress the picture in memory. What you get is the same information, but you have a wide choice of picture sizes.

The major difference between Image Printer and Zoom Graftix is that IP works only with a few printers, but they are printers that happen to be the most popular for the Apple anyway. And Image Printer allows you to shrink the image. With Zoom Graftix you can zoom and zoom, but that can also be accomplished with Image Printer by requesting small parts of a picture to be printed in double or triple size.

Both programs work with an Ap-



ple II, II Plus, IIe or Franklin Ace, 48K of RAM, a disk drive, DOS 3.3 and TV or monitor.

Image Printer is manufactured by Sensible Software, 6619 Perham Drive, West Bloomfield, MI 48033. Price is \$49.95. Zoom Grafix is from Phoenix Software, 64 Lake Zurich Drive, Lake Zurich, IL 60047. Price is \$49.95. ■

Jerry Brieger
Redmond, WA

Editor's note: According to Sensible Software, a new version of Image Printer, Image Printer II, supports 42 different printers. Pictures can be printed horizontally or vertically on most printers and can be printed in a large variety of sizes. Image Printer II lets you customize your picture by adding titles, lines, boxes and color filling. It is not copy protected.

Legacy of Llylgamyn

If it's another scenario for Wizardry by Sir-tech, it's got to be good. Well, the third scenario in the Wizardry saga, *Legacy of Llylgamyn*, is not good. It's great! This is the first scenario to be designed by the Wizardry Adventurer's Research Group,

commonly called W.A.R.G.

In *Legacy*, you don't use your old characters from the two previous scenarios, you use their descendents. After you transfer the spirits of your original characters to the *Legacy* player disk, you go through a ceremony that bestows your new, first-level characters with the names, titles, and some of the skills and traits of the old adventurers. You get none of your old character's equipment, but you do get a purse of gold to buy the necessary weapons and armor for the quest. Because old characters are used, the original *Wizardry* is required. In order to play you must make a duplicate scenario. Even if you have only one disk drive, you can make a duplicate scenario.

The objective in this scenario is to seek out the dragon L'kbreth and capture the orb that is entrusted to her. If you fail, it could be the end of the entire world! L'kbreth is protected by traps, puzzles and an unlimited number of monsters. She also uses both good and evil magic to keep you from her orb.

On the first level of the maze, you encounter the same type of monster again and again. But don't despair. On level two and up, you encounter the most bizarre monsters imaginable.

The view of the maze has changed drastically. There is not a small picture of what your group can see on part of the screen and boxes with useful information on the rest of the screen. In *Legacy*, there's a full screen maze. You can check the status of your characters by pressing O or S. When a group of monsters are encountered, a larger and more detailed picture of the enemy is shown. The only trouble with the new graphics is that the play, both while traveling in the maze and while in combat, is a little slower. However, you will find the new system to be well worth it.

Legacy is a terrific game, superbly programmed. It will provide you with many hours (months, years?) of enjoyment. It is manufactured by Sir-tech, 6 Main St., Ogdensburg, NY 13669. Price is \$39.95. ■

Steven Kirchhof
Granby, MA

Market Illustrator

Among the most avidly read features in *The Wall Street Journal*, *Barron's* and *Business Week* are the market graphs. The reason behind their popularity is simple: They inform you at a glance about recent economic trends and forces.

The trouble with most published graphs is that they are aimed at the broadest readership possible. Your investment interests are likely to be more specific in nature than those general trends represented on the Dow Jones graph in *The Wall Street Journal*. If you are trying to track the effect of the prime rate on market behavior, for example, you are not usually going to see this information in graph form in the mass financial journals. You will have to study the raw data from sources like *Barron's* and the *Journal*, and then laboriously construct your own analyses and charts.

The N2 Market Illustrator is a powerful and well-supported system for the compilation of market graphs.

There are 20 general files of data in all, including market trends, stock indexes, Dow averages, federal reserve rates, financial rates, money rates, bond statistics, *Barron's* 20 and 50 stock indexes, stock sales volume, and groups of stocks categorized alphabetically by type. Each of these general files, in turn, is divided into more specialized subsets of data, allowing the user to focus on the information he needs.

Let's look at some of the comparison graphs you can build. Assume that you have an investment decision to make, and you've narrowed your choices down to treasury bills, office equipment company stocks, electrical equipment company stocks and gold mining stocks. Each of these categories has shown positive and negative movement in the past. You must ask: Which form of investment has shown the most consistent growth and where do the trends point?

With Market Illustrator, you first select a time period over which to measure the performance of these groups. Market Illustrator allows you to create charts of 52, 70 or 104 week duration. For my purposes, I selected 104 weeks, from March 1981 to March 1983.

Next, the program prompts you to select one of 20 groups in an overall database. To compare the performance of office equipment stocks with treasury bills, select the files FRS Rates (Federal Reserve System rates) and M-P Group (categories of stocks arranged alphabetically from M to P).

After the appropriate data is loaded from the database disk, the subset headings under the two files appear. The FRS Rates file lists data for federal funds, treasury bills, commercial paper, certificates of deposit and Eurodollars. You should then key in the two-number code for the treasury bills subset. Look at the M-P Group stock subsets—machine tools, machinery, motion pictures, nonferrous metals, office equipment, oil, packing and paper—and key in the two-number code for office equipment.

The program loads the data into

memory and displays a screen menu. You can modify the plotting parameters, select new data files and subsets, return to the last graph plotted or plot a new graph. When you select the plot graph option, the hi-res screen appears and a line graph is drawn.

A jagged horizontal line at the top of the graph represents the interest rates set at weekly auctions for short term treasury bills for the past two years. The graph reveals a steady decline in interest rates (and thus yield for a potential investor) from June of 1982 onwards. Using the same time scale, and on the same graphic, the program now draws a line representing the average prices of office equipment stocks, as reported by Dow Jones in *Barron's*. This graphic demonstrates that at about the same time treasury bill interest rates started to level off and then decline, the value of office equipment company shares began a steady advance. Using a movable vertical cursor and optional data readout, you can establish the exact dates (and the yields and prices) when these two trends began.

Using an exponential smoothing feature, which redraws the lines to reveal trends more clearly, I noticed that treasury bills, though a safe investment, are likely to continue to provide unexciting yields. The trend for office equipment stocks indicates exciting opportunities for capital growth.

I then redrew the graph, using the Select New Data Files option, and had a look at office equipment versus gold mining shares. The rough graph that the Market Illustrator drew shows an uneven performance for gold shares over a two year period, but a general upswing in prices after hitting a low for the period in November 1981. Overall, office equipment still looked like a better investment; the graph indicated a steadier and less troubled advance in prices.

Redrawing the graph to see how office equipment company shares did against electrical equipment company stocks, I found similar rates of growth

for 1982-83. Nonetheless, the graphics seem to show that the overall performance of the office equipment stocks inspires just a little more confidence.

The comparisons you can make with this program are almost endless. You can compare performance data on dissimilar types of investments, or you can check performance against the forces that influence the market such as the prime rate. You can be as general as you want—you can chart the effect of the prime on the Dow Jones Industrial index, for example. You can be much more specific in your charting too; for example, you can compare the prime rate to the performance of farm equipment stocks.

You can check performance figures against volume figures to discern overall market trends. You may want to prepare a graph to see how the New York Stock Exchange volume corresponds to the Dow Jones closing index on a week to week basis. This enables you to determine if a decline in the index is a serious retreat, supported by a heavy volume of trading, or if it's a correction or merely a seasonal slump. You can quickly construct similar sales/volume charts for a number of indexes and compare volume to general market prices.

The Market Illustrator's second graphics generating program constructs single issue charts for stocks and futures. In this program, the performance of commodities futures or individual stocks for up to 160 trading days can be plotted on a graph.

For this particular function, no database disk is provided. It is up to the user to input the data on the commodities or issues he/she wishes to track into a separate disk (a standard disk should be able to accept 30 complete files) and to keep those files updated. For demonstration purposes, two files (IBM and General Motors) are included on the program disk.

Graphs are generated in much the same way as in the first version. Once the graph is plotted, you see a

series of floating bars at the top of the screen. These represent the range of trading for the stock in question on each day of trading. A hashmark on the bar represents the closing price. At the bottom of the chart is a bar graph of the volume. Moving the cursor across the chart with the data indicator on, you get the date, individual closing prices and a net positive volume readout.

Overall, data handling is fairly flexible. The data disks can be updated almost at will. One method of updating is to follow the steps outlined in the manual for inputting the data on your own. Program options on the master disk support this activity.

Using the various program routines available, you can also merge files, create specialized groupings of data, convert daily stock or futures data to weekly files for comparison with the other weekly indicators and copy files onto other disks.

The manual is not written with crystal clarity, but is sufficient. In addition to the manual, there is an updated version of *The ABC's of Market Forecasting*, by Dr. Martin E. Zweig. It explains how to interpret the market data that *Barron's* publishes, which is the foundation of the database used in the Market Illustrator.

N2 Computing of 5318 Forest Ridge Road, Silverton, OR 97381 is the manufacturer of this software. The list price is \$195. Market Illustrator will run on the Apple II, the IIe and on the Apple III in the emulation mode. ■

Brian Murphy
Fairfield, CT

Editor's note: According to N2 Computing, there is now a compiled version of the program and a high-speed DOS that makes it operate from two to four times faster.

Amortize It

Once upon a time, when life was simple and interest rates

low, I had a little blue book that contained all the amortization schedules one might possibly need to pay off a home mortgage. Interest rates ran in 1/4 percent steps from four to eight percent. Amortization schedules were shown for loans from \$1000 to \$40,000, and balloons (loan balances due before full amortization) were something only for kids. If a prospective buyer of real estate property asked what his monthly payments would be, I could tell him by simply consulting this handy thin book. Maybe you've seen one like it. I kept it for many years, but recently threw it out as useless.

The finance business and loan amortization have become extremely complicated. For normal amortization, interest rates cover a wide range and include fractions like 12 7/8 percent. There are balloon payments after several years of level outlays, payments based on percent of declining balance and level principal amortization.

That's where your Apple computer comes in. Its capabilities lend themselves to solving the above-mentioned problems. Don't worry, the work has already been done for you. Loan Amortization and Loan Analyzer are two excellent programs that will compute most, if not all, conditions for paying off a loan over a fixed period of time. And both are easy to learn and operate and require no programming skills at all.

Loan Amortization is a compiled Applesoft program that could not be simpler to use. It comes with a 43-page manual in a hardcover three-ring binder. Everything is clearly explained.

The program is designed so that you will hardly have to read the documentation. After booting the disk, you are presented with a series of menus. Follow the prompts, and you can't miss. Data entry is program controlled. Incorrect or invalid entries will not be accepted. For example, you cannot enter a loan term greater than the amortization period. The first menu shows the four types of amortization that are

available with this program: Normal Amortization, Percent of Declining Balance, Level Principal and Deferred Payments. The last three are used less frequently, but when you want them, they are available for evaluating credit card debt or investment situations.

The program can also be used to calculate deferred annuities, which have become popular for retirement planning, by first using Option 4 (Accumulated Interest). The future value is computed and then amortized over a desired payment period.

While monthly payouts are demonstrated, the program also produces tables with annual, semiannual and quarterly periods. Balloon payments may be included. Only 12 periods are printed to illustrate examples. The program is capable of calculating and printing up to 420 periods.

There is a useful screen that allows the user to select any two periods, and the program will calculate total payments, interest and principal paid through the time period as well as the ending loan balance.

Loan Analyzer is a VisiCalc template that you load after booting VisiCalc. If you own and are already familiar with this spreadsheet program, you will find Loan Analyzer easy to operate. There are three different modules or templates on the program disk. You can calculate the payoff on a loan annually over a period of up to 36 years, including one balloon payment.

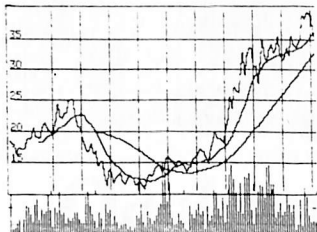
Loan Analyzer is packaged in a padded three-ring binder. The instructions are arranged in five chapters which explain the various templates plus a brief explanation of VisiCalc as it applies here.

One nice feature of the program is that it will check for most data-entry errors. If an error occurs, it will be noted to the right of the entry by an asterisk. An example of an entry error would be a monthly payment less than the amount required to repay the loan over a specified period. Usually, the monthly payment should be left at zero here.

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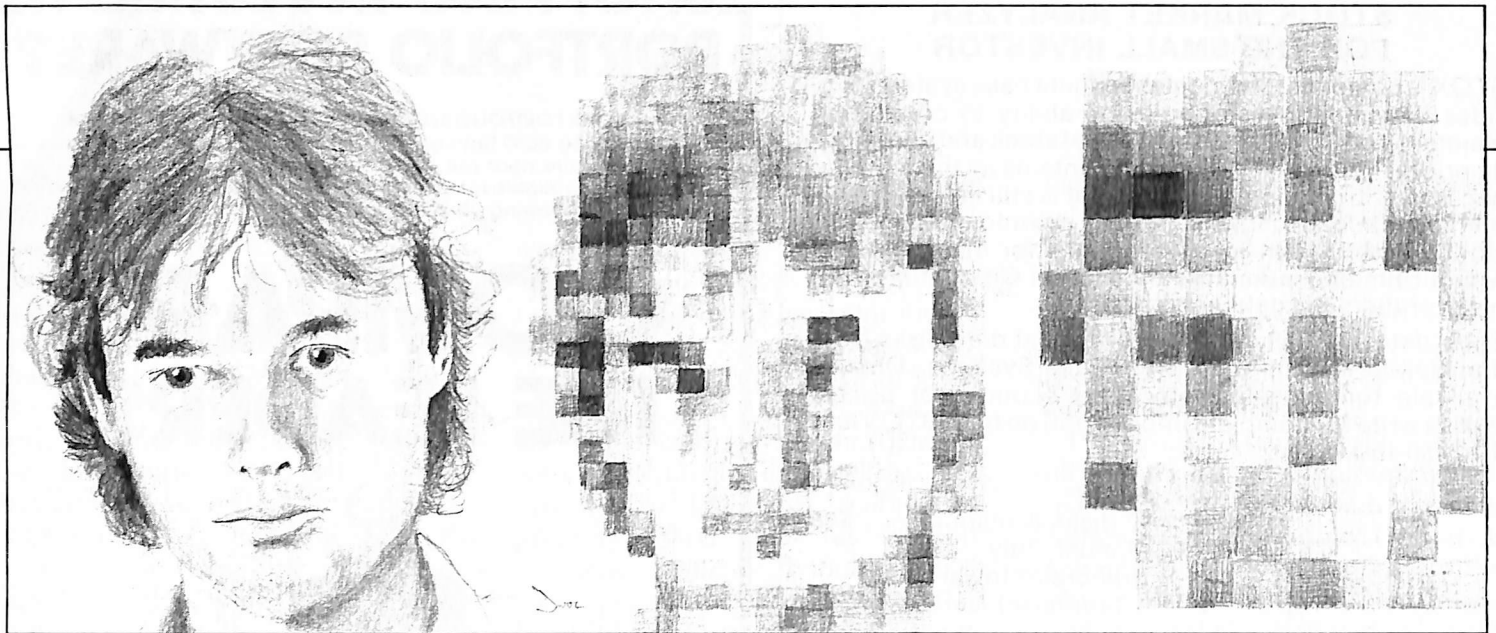


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If you want a monthly schedule, you go to the second module, Monthly Mortgage Amortization. While it's called a mortgage schedule, it could very well be used for consumer loans such as payments on a car loan. The monthly analyzer operates very much as the annual template.

The third template, Special Loan Calculations, has a number of utilities handy for more unusual loans. There are allowances for Early Termination, Discount Points, Loan Origination Fee and Other Charges. These are features which mortgage lenders love. They add to profits.

Which package should you purchase? The Loan Amortization Program costs less, requires only 48K of memory and does not require VisiCalc. It will print out any one of monthly, quarterly, semiannual and annual amortization schedules in one pass. Besides that, you have several types of amortization available. The Loan Analyzer offers the Special Loan Calculations in addition to the standard schedules.

The final choice is yours and depends upon your specific requirements. Loan Amortization costs \$59.95 and is manufactured by Recom Data Company, 5930 146th Place SE, Bellevue, WA 98006. Loan Analyzer is \$99.95 and is made by Simple Soft Inc., 480 Eagle Drive, Suite 101, Elk Grove, IL 60007. ■

Jerry Brieger
Redmond, WA

Police Artist

Police Artist is an enjoyable series of three face-identification games written for children. The author, Elizabeth Levin, has previously written games for Sesame Place in Philadelphia, and her educational expertise and imagination are evident in this series.

This series of games, however, is recommended for older children (ages 7 and up), an appropriate designation because of the subject matter. The premise, according to Sirtech's advertisements, is, "Suppose you witness a crime..."

The first two games are memory challenges that have several levels of play. They begin with easy choices and become more difficult as you enter the higher levels of each game.

In Police Lineup there are four skill levels. The player earns rewards according to his/her identification of suspects, and the reward accumulates until the player makes a mistake. Each of the levels shows the culprit for a shorter period of time and then produces a larger group of suspects from which to choose.

Police Artist allows the player to look at the face of a culprit while the computer indicates the length of viewing time. When the space bar is pressed, the face disappears. By choosing among randomly generated styles of face parts, the player tries to reconstruct the face from a series of chins, eyes, noses, mouths

and so on. In this game, too, there are four levels. Level 1 provides two choices for each feature; level 2 provides four choices; level 3 provides eight choices; and level 4 presents 16 choices for each. When the face is completed, you press return (the done sign is on at this point) and see both faces, the peek time, and the features you chose correctly and incorrectly. Children immediately try to better their previous scores, aiming for less peek time and more correct features.

Off Duty takes advantage of the many different facial features stored in the program to let the player design his own faces, using those features which appear on the screen. According to the publisher, there are 1,048,576 possible combinations. Making a wide variety of silly or scary faces can be fun, and the cartoon-like features make the prospects even more interesting.

The package consists of one disk and an instruction booklet. The disk is two-sided, with the backup on the second side. This has its advantages, but also some serious disadvantages. When I received my copy of Police Artist, the first side was defective and would not boot. I was immediately able to turn over the disk and use the second-side copy. (Side two does not record high scores, however). The disadvantage is, of course, that if you wish to return the disk to the publisher for replacement, you are left with only the booklet until the new one arrives. If you buy Police Artist (or any

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other software) from a reliable source, they will replace defective disks quickly and without problems.

The documentation is clear and concise, with a table that indicates the six command keys needed. There is an additional command to turn off the sound. The commands are consistent throughout the levels of the three games, making them very easy to play.

Ms. Levin has learned her craft well and produced a series of excellent memory-training games that children ages 7 and up will enjoy playing.

Police Artist is published by Sirtech Software, Inc., 6 Main Street, Ogdensburg, NY 13669. The suggested retail price is \$34.95. ■

Janet Meizel
 Davis, CA

The Incredible Jack

The Incredible Jack, a word processor from Business Solutions Inc., lets you create letters and/or documents with embedded calculations. With it, you can create form letters with variable data fields and selectively transfer the variable information from one file to another.

Jack runs on an Apple II computer with at least two disk drives, 48K RAM, a 16K RAM card and a printer interface in slot 1. An 80-column board is not required; if you only have a 40-column screen, provision is made for flipping from the left half of the screen to the right half. An upper/lower case keyboard modification is not required.

The maximum capacities of Jack are impressive: up to 60 files per disk, 1000 records per file, 3500 characters per record. However, if a file has 1000 records, it will take up the entire disk. A file can be as large as a disk. The formula for calculating a numerical value may be up to 240 characters long.

Printer output is easy to set up. When you select the Print option, you are presented with a menu con-

taining either default values or the values previously set. You can specify the column width, page length, line spacing and margin justification. You can also specify the number of lines to skip at the top or the bottom of the page and the top and/or bottom title lines. The top and bottom title lines may consist of three fields each: a left justified field, a centered field and a right justified field. If you specify the page number in any of the title fields, it will be calculated and printed. You can even tell Jack to stop printing at the end of each page to allow changing the paper in the printer.

The Incredible Jack contains a Copy option that is one of the best features I have seen in any program. Using this feature, you can copy an entire data disk, or you can copy selected records from one file to another. For instance, if you have created letters for several different people in one file and wish to print mailing labels for those letters, just create a Label file with matching field names and copy the variable data to that file using the copy feature.

You can conditionally select some or all of the records and then list, print or sort the records you have selected. The conditions you specify can be quite complicated.

Setting tab stops and inserting, changing or deleting data is cursor controlled, and the different modes are controlled by pressing the control key and the appropriate letter key. The manual is well written and it contains an easy-to-follow tutorial and a detailed reference section.

Be sure to send in the owner registration card. If your program disk should prove to be faulty, you can return it for a free replacement during the 90-day warranty period. The program disk is copy-protected, but you can obtain one back-up disk from Business Solutions Inc.

Jack requires two disk drives for copying files from one disk to another but only two drives for copying entire disks. This makes it difficult to consolidate data files onto one disk. Except for the Select option, which was

"HOB will not let you type in syntactically incorrect statements. It stops and beeps at the first incorrect character."

mentioned earlier, there is no provision for global searches or changes. Also, there is no provision for creating running totals. Jack Report, a new Business Solutions program, provides this function.

One of the big problems with Jack is its speed. I created a file with less than 100 records—each record contained about 312 characters of data—and to find and display a particular record took about five minutes. It took an additional three minutes to update and then save the record. To copy the data from the original file to another file with a different format, such as a Label file, took almost nine minutes.

Except for the above comments, I found Jack to be incredible. It is easy to learn and easy to use. The manual is well organized. For \$179, you can be writing form letters within minutes. The Incredible Jack can be obtained from your local supplier or from Business Solutions Inc., 60 E. Main St., Kings Park, NY 11754. ■

Jerry Mahaffey
Methuen, MA

Editor's note: The manufacturer states that speed can be increased by searching on key fields.

Hands on Basic Programming

Basic, I was once told by a salesman, is just like English. I don't agree. That is, I know precious few people who go around saying:

```
10 FOR I = 1 TO J
20 PRINT "HI ";NAME$
30 NEXT I
```

Learning logic and understanding the problem is more difficult than learning Basic syntax. But still, you need to learn Basic. Hands on Basic Programming is designed to address

that very problem. HOB is a dialect of Basic, modelled after ANSI Standard Basic, with many built-in diagnostic tools that can help the beginning programmer learn the syntax and understand mistakes.

For instance, HOB will not let you type a syntactically incorrect statement. It stops and beeps at the first incorrect character. If you persist in typing an incorrect character, you get a Try Message that lists the only acceptable characters. For example, if you didn't know the correct symbol for multiplication, you might enter LET A = L x W. Anyway, most Basics will let you do that and later give you a cryptical Syntax Error at run time. Hands on Basic will beep when you enter the multiplication sign. If you keep trying, it will display TRY <0123456789(*-+ /CR>. The characters between the < > represent the only legal entries.

HOB is, however, much more restrictive than Applesoft Basic. The differences are clearly indicated in the manual, but if you are used to Applesoft Basic, it's a bit disconcerting to be beeped at when you are doing something perfectly acceptable in that dialect.

HOB contains a plethora of debugging aids. You can slow down the processing in order to watch the program run. There is a screen on which you can observe the action of For/Next loops. And seven other program tracking screens can be used to help you understand the general concepts of Basic or to debug a specific program.

The manual is well written from a functional standpoint, but it is full of irritating typographical errors. It is, however, full of good examples.

Although HOB is an excellent tutorial on Basic, I do have a problem with some of its features. If I bought HOB in order to learn Applesoft Basic, it wouldn't be terribly useful to learn Rollout and Rollin instead of Save and Load or to have spent time learning about Randomize and Do loops, which are not implemented in Applesoft. As mentioned above, the manual indicates

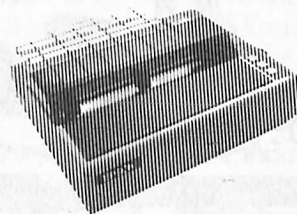
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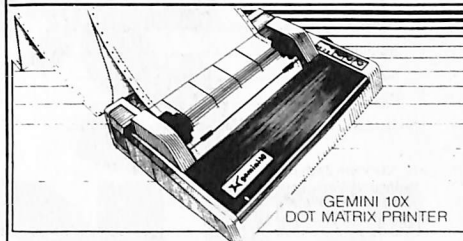
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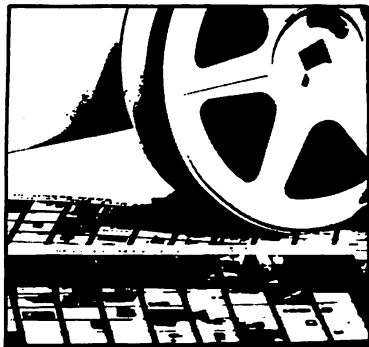
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differences between HOB and Applesoft, but there could be fewer differences.

I don't think that you could use HOB instead of Applesoft for any serious programming. It is designed as a teaching language. As soon as a program ends, it shows the Command screen. Anything you printed is on the Print screen. It can be seen, but you must enter control-P to access it. While working with HOB for this review, this feature was confusing. I jumped ahead of the manual a bit and started to write my own little program with a For/Next loop. I ran it and my results flashed across the screen and then were gone. I tried everything and couldn't seem to keep, or even find, my results. As a last resort, I read the manual. And there, much to my amazement, was a nice little paragraph explaining that, when reaching the End statement, HOB displays the Command screen and that control-P accesses the Print screen.

On balance, HOB is certainly a good way to learn Basic. While I'd have been happier if it were more specifically oriented towards Applesoft, no piece of software can be all things to all users. I consider it a good tutorial. If you need coaching on the basics of Basic, or know someone who does, HOB is for you.

HOB is manufactured by EduWare Services Inc., Box 22222, Agoura, CA 91301 and is distributed by Peachtree Software, 3445 Peachtree Road NE, Atlanta, GA 30326. ■

Ron DelPorto
Erie, PA

This neat little feature allows you to send a character font—created in software—to the printer and use it alone or in combination with the standard type style. Unfortunately, the DMP does not include alternate character sets on the demo disk. Where do you get them?

Micro-Ware Distributing Inc. has moved quickly to provide a solution. Font Downloader and Editor offers four alternate character sets and an editor to use in creating your own type styles, graphic symbols, and anything else you might wish to dump to the DMP. With the program you may download an existing font, edit/create a font, see a demo or print the instruction manual.

Downloading a Font

This option is used just prior to beginning word processing, program listing or any other task where a special character set would be helpful. To download a font, turn on the DMP and specify a character set filename (a provided font or one of your own). Once the font has been downloaded, turn off your Apple and begin the desired computer activity. The new character font temporarily replaces the standard font and will remain active as long as the DMP stays on. Two escape commands—`<ESC> $` to switch to the built-in set and `<ESC> '` to switch back to the custom set—allow you to switch back and forth between character sets. Special print functions such as underlining, enhanced, expanded, and compressed printing all apply to the custom character set as well.

Using the Font Editor

After choosing this menu option, a character set is loaded and displayed in an enlarged format on the screen. Using the Select mode and the I, J, K, and M keys, you identify the character to edit or replace. Pressing R (for replace) transfers the character to a grid on the right side of the screen and puts you in Edit mode. While in Edit, you may selectively turn each dot in the grid on or off (using the space bar) to modify the character. Movement from dot to dot is per-

Font Downloader and Editor

Those of you who own or are thinking about buying the Apple Dot Matrix Printer (reviewed in the December '83 issue of *inCider*) are undoubtedly aware of its ability to print with custom character sets.

"The program could use some prompt, particularly when disk insertion is required."

formed using the same set of keys as in the Select mode. If you wish to create a character from scratch, the C key clears the grid. When you are through, R replaces the original character in the main font with the one you just created or edited and returns you to Select mode.

When you are ready to really do something with your new font, Select mode provides an option to download the characters to the printer and print them out. You may also save the font to a disk or load a different font for editing.

Nobody's Perfect

In general, Font Downloader and Editor performs its job well. If you follow the directions and practice a bit before getting down to some serious font creating, you should have little difficulty using this utility.

However, there are some small problems. First, Micro-Ware has followed a practice that I fear may become standard with other software houses—using inexpensive disks to cut costs. I suspect they are inexpensive, since my copy only boots about 75 percent of the time.

Second, because the disk is self-documenting, the firm apparently decided to eliminate any mention of what the program does. I suspect it will be difficult for retailers to sell the program this way.

Third, the program could use some prompts, particularly when disk insertion is required for loading or saving a font. Although most of this action will take place with the provided disk, you may prefer to save new fonts to your own formatted disks. If you intend to do this, just remember that each load/save operation occurs immediately after specifying the filename.

Fourth, the error-trapping is only fair at best. Although inappropriate keypresses are caught, many disk-related errors force you to reboot. Also, a particularly messy error occurs if you try to download a font and forget to have your printer on and selected. As long as you exercise some caution, however, such errors should be fairly

infrequent.

Finally, Font Downloader and Editor makes every effort to prove its importance to you. It doesn't want you to leave! Control-C records an

error and is then ignored, reset reboots the disk, and no menu options are provided to let you leave the program or boot another disk. You must turn the Apple off to leave the program. In my case, since I have a DOS 3.2 word processor (Super Text II), this works out well. If the character set were retained in memory rather

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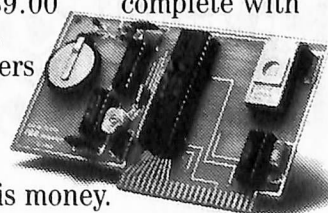
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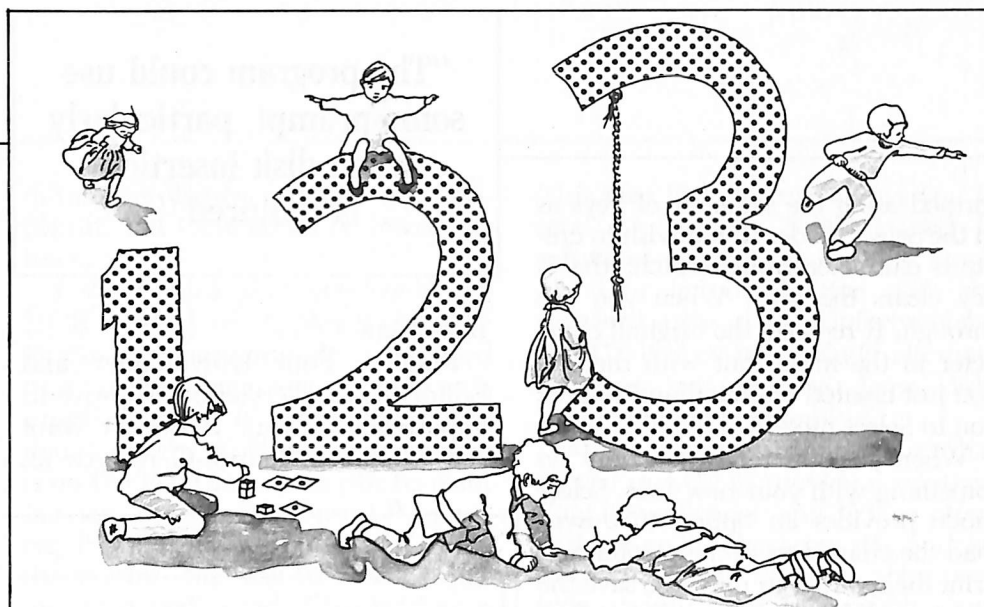
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than in the DMP, I would lose it when switching DOS versions.

Most of these problems seem to fall in the category of "professional touches." Font Downloader and Editor is already a good program and worthy of purchase. With a little work, it could be a great program.

Font Downloader and Editor for the Apple Dot Matrix Printer is available from Micro-Ware Distributing Inc., Box 113, Pompton Plains, NJ 07444. It requires an Apple II, II Plus, or IIe, an Apple Dot Matrix Printer, a parallel printer card, and one drive (DOS 3.3). According to the manufacturers, it should work with most of the common word processing programs. Price is \$39.95. ■

Steven Schwartz
 Pittsburgh, PA

mation. The program is accompanied by an excellent teacher's manual.

The disk, which can store data on up to 50 children, contains three programs. Let's Count has cute colorful pictures. If the child answers the questions correctly a happy face appears; wrong answers bring correctional instructions. Let's Tell Time is the best clock-reading CAI program I have ever seen. It advances in logical sequence through progressively harder clock faces. Arithmetic Fun really is fun. The child must decide either to help the beautiful heroine save the prince from the troll or to help the troll capture the prince. (The boys in my test group all helped the troll.) The graphics are bright and clear and complemented by good animation and sound.

I tried the program out on four young men, ages five through ten, and they all loved it. The five-year-old, for instance, played it for 30 to 40 minutes at a time and even got up at 6:30 a.m. to play it before going to kindergarten.

This is a good program for use both at home and in the classroom. It includes many features which make it extremely user friendly for the young learner.

Kids' Corner: Learning About Numbers Volume 1 is manufactured by C & C Software, 5713 Kentford Circle, Wichita, KS 67220. The suggested retail price is \$40. A back-up disk is available for \$10. ■

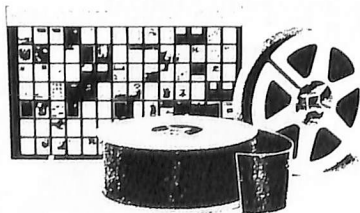
John Tkach
 Bozeman, MT

Kids' Corner: Learning About Numbers

Just another arithmetic drill program? No way. There's a whole lot more to Learning About Numbers Volume 1 than meets the eye.

The programs are appropriate for children ages four to ten. Once the youngster boots up, the program automatically advances him or her to a higher difficulty level as each level is mastered. The program also records the student's performance and skill level so that the teacher may later obtain a printout of this infor-

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Hardware Reviews

E-Z Card

Do you want to run CP/M programs on your Apple but don't want to spend a lot of money? You might be tempted by one of the new versions of the Z-80 card, compatible with the original Microsoft SoftCard. One of the cheapest is the E-Z Card Hobby-Kit, which is only \$60. The catch is you have to put the parts together and do the soldering yourself.

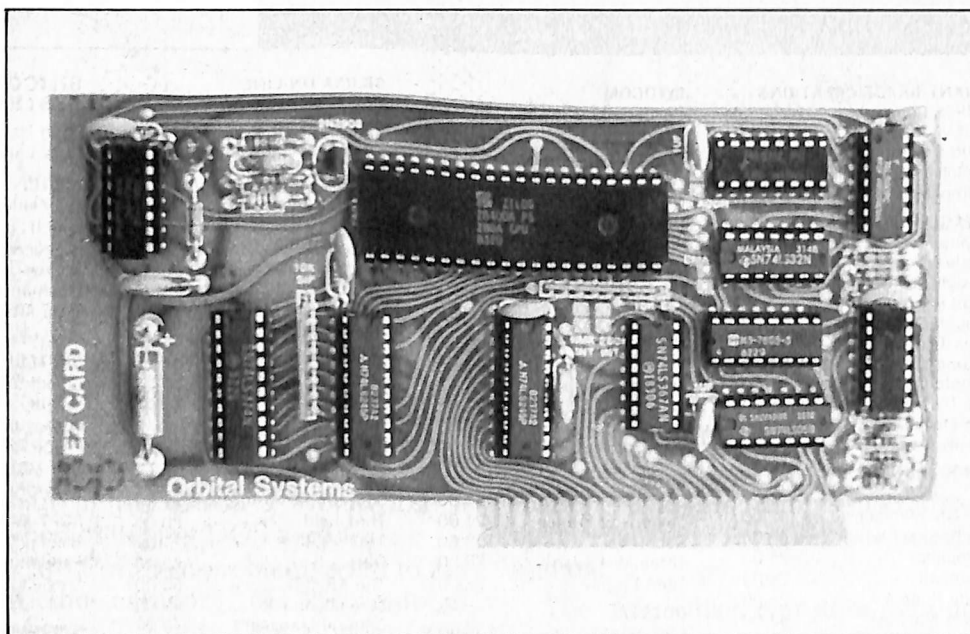
If you get one of these cards you won't be able to use it unless you buy, borrow or steal some software. In addition the operating system, CP/M, is not included.

The card Orbital Systems sent me for review was assembled, so I did not have the pleasure of making all those tiny solder joints. I have talked to some of my friends who have successfully constructed this kit, and they had no trouble with it. If your soldering expertise is on a par with mine, though, you may want to spend an extra \$30 to have it assembled and tested by Orbital. If it does not work after you have constructed it, Orbital will fix it for \$30, but only if you follow their instructions.

The card is rather straightforward, with a 4 mHz Z-80A CPU (actually probably 3.58 mHz, though it makes no difference, since much of the limitation to my throughput is that the 6502 has to do the input and output anyway). There is an LED on the card so you know when it is enabled (of course, you have to keep your Apple's cover off as I do if you want to see the red light).

I had only one problem with the card: it wouldn't work at all in my Apple IIe. When I placed it in any slot and booted any CP/M master disk, all I could get was a lot of ugly inverse characters on the screen. I looked again at the advertisement and the short assembly instructions that came with the card. Sure enough, it is supposed to run on a IIe.

I looked on the card and couldn't



The E-Z Card.

see any solder bridges or bent pins. Then I tried it on an Apple II Plus, and it worked fine. I called Orbital Systems and discovered that you can exchange the card for a IIe version. Seems somebody mucked up with the IIe design and the timing is all off. (Some SoftCards have the same problem in the IIe, I've heard.)

There are four jumper options on the card. The instructions refer to them, but you will need to know more before deciding to make these modifications. One disables the normal address offset by 1000 hex and the others, DMA enable, NMK INT, and Z80 INIT, enable interrupts.

An alternative to the E-Z Card is one of the newer Z-80 cards from ALS or Microsoft for the IIe. These are somewhat faster in CPU clock speed, and come with improved software, such as CP/M 3.0, which is more user-friendly. The price is of course a lot more than the simple board models. I might add that Orbital Systems makes two more card kits which I have not had a chance to review, namely an 80-column card with 64K of memory for the Apple IIe, and the Copycard, which is supposed to help you to back up copy protected programs. They are planning to produce two other inexpensive cards, an 80/132 column card

and a 128K RAM card for the Apple II and II Plus.

Once you advance to a certain level with your Apple, you might want to expand your possibilities with one of these card kits. It is even easier if you get with your friends to make the project together. Good luck.

Write to Orbital Systems at 2929 E. Jasmine, Mesa, AZ 85203. ■

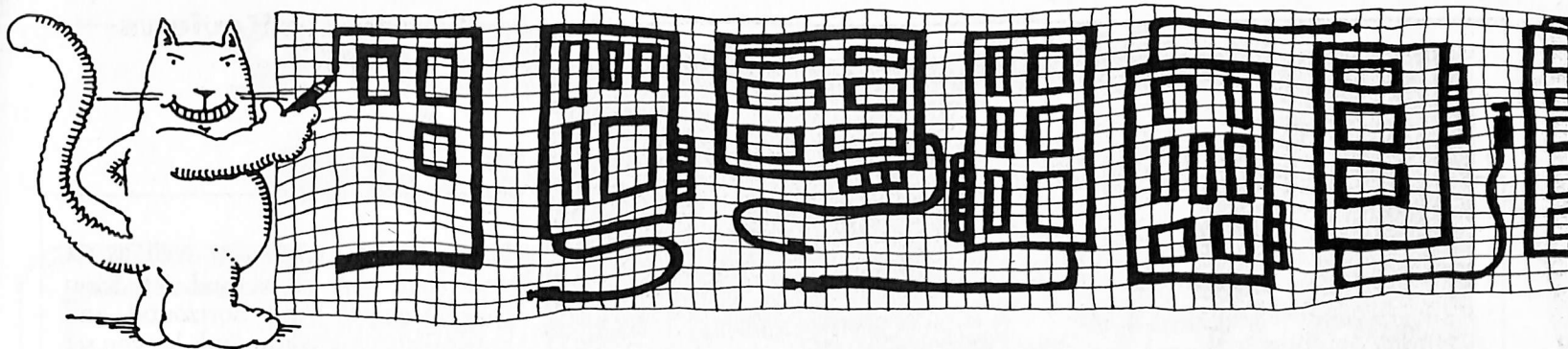
Eric Eldred
Derry, NH

Editor's note: There are now separate E-Z cards made for the II Plus and IIe.

Apple Letter Quality Printer

For years, the only printer with a genuine Apple logo has been the Silentype. Small, inexpensive, and silent, this thermal printer has met some users' needs for hard copy. But thermal printers have strict limitations, including mediocre print quality and the need for expensive, special paper.

Apple Computer finally has two other printer options to offer its cus-



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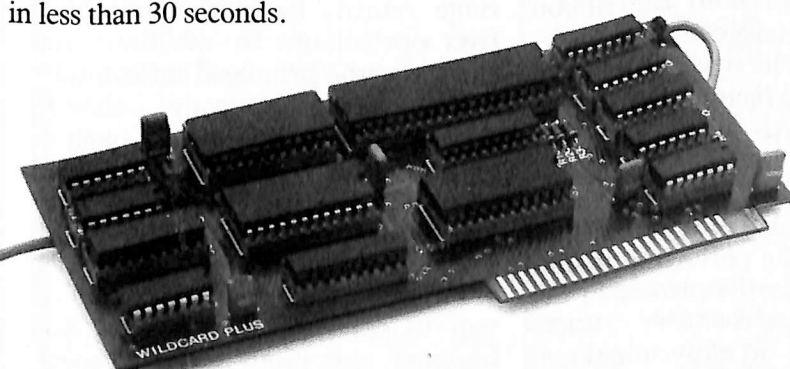
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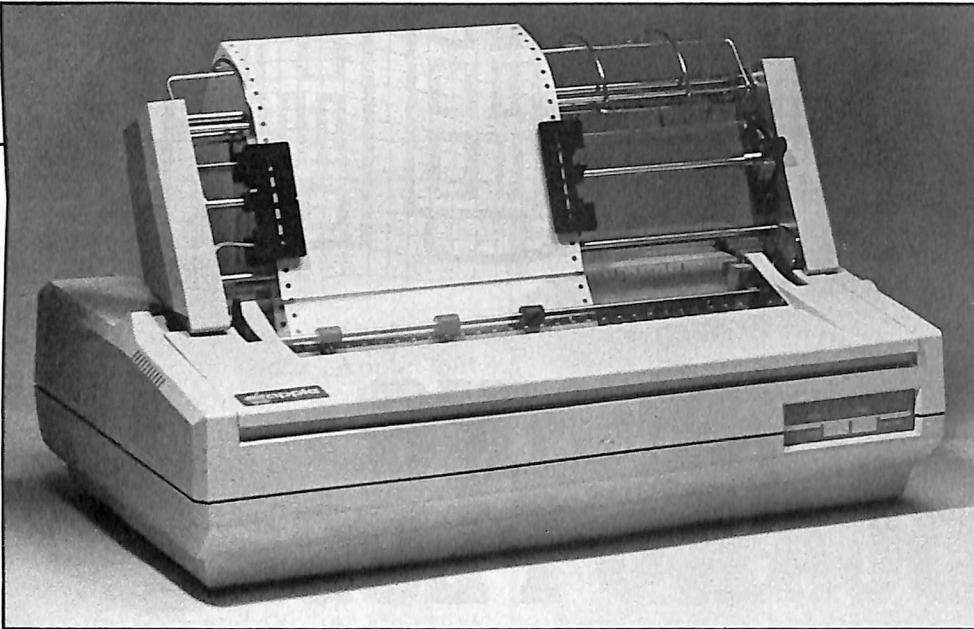
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The Apple Letter Quality Printer, pictured with tractor form feeder.

tomers. One is the Apple Letter Quality Printer, a printer my Apple has become quite attached to these past couple of months.

The chief virtue of the LQP is the impeccable appearance of its print-out. If you don't need copy that looks like it just emerged from an office electric typewriter, then you don't need any daisywheel printer, including the Apple LQP. But if you do need that quality, you will find it very attractively packaged in the LQP.

The LQP is fairly fast and quiet for a daisywheel printer. Although I found no speed rating in the literature packed with the printer, its pace seems to be about 40 characters per second. As is typical with such printers, it prints bidirectionally and has the intelligence to move the printhead the shortest distance to proceed to the next line. With these abilities the LQP can spew out a full page in just over a minute with 60-character lines, single-spaced, and double spacing between paragraphs.

The noise generated while doing this is considerable. You'd want to be sure your cat was forewarned if it was sleeping nearby. However, it's quieter than other high quality daisywheel printers I've heard.

Like most daisywheel printers, the LQP is designed primarily for single-sheet printing. It accepts paper up to 15 inches wide and adjusts for varying weights. It has no built-in tractor feed mechanism; although

you can feed continuous lengths of paper into it, the paper will eventually drift to one side. The friction feeding mechanism is, however, quite steady and reliable.

Front-panel controls are simple and few, consisting of two touch-panel buttons and two lights. One button is marked PAUSE and is used to stop printing (place the printer off-line) at any time. The other button is marked FORM FEED and advances the paper to the top of the next page. The two lights indicate READY and ATTEND. The latter calls attention to problems such as a loose cover or exhausted ribbon.

Replacement of both the ribbon cartridge and daisywheel is easy, clean and fast. The daisywheel is an oversize, 130-character type that is not compatible with smaller daisywheels.

The LQP recognizes a wide range of print control commands that make it a versatile performer. Commands are sent to the printer in the form of the escape character CHR\$(27) followed by one or more additional characters. The reference card (a very handy piece of paper) lists ten commands for page formatting, four for horizontal and vertical spacing, 14 for printer system configuration, 14 for character control, 16 for print head positioning, four for program mode operation, three for graphics mode operation and two for printer status. Page formatting commands enable you to set left, right, top and

bottom page margins as well as set and clear tab stops and set form (page) length. And horizontal and vertical spacing commands let you set the distance between characters on each line (in 1/120th inch increments) and the distance between lines (in 1/48th inch increments).

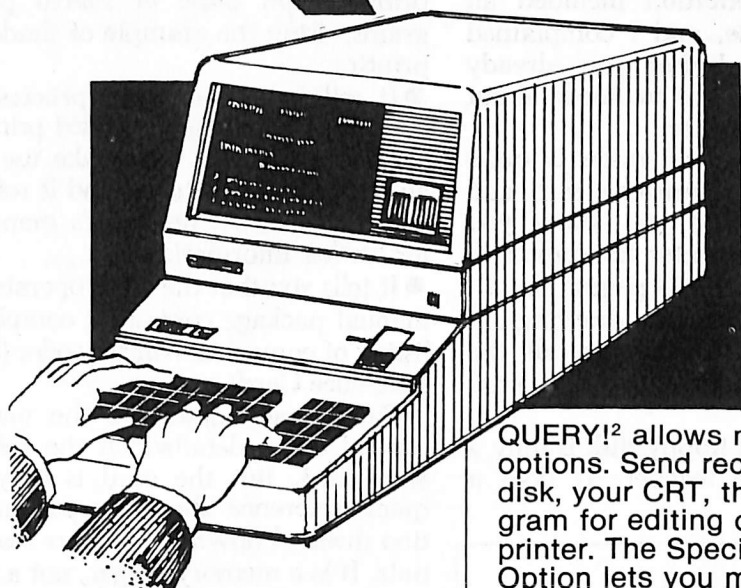
Printer system configuration commands allow you to control some of the details of printer operation. You can play with various linefeed and carriage return combinations, specify forward or backward printhead movement, choose or suppress bidirectional printing, reinitialize everything to its power-on state and do a few other tricks. One command allows you, at least in a limited way, to automatically end printed lines between words. Of course, word processing software will do this automatically, but you may have occasion to use such a feature when printing from one of your own programs.

Character commands control the use of foreign language printwheels, bold printing (two or more strikes in the same position), shadow printing (two strikes 1/120th inch apart), underscoring and a few other functions. Printhead positioning commands include normal linefeed, carriage return, backspace and form feed operations. In addition, you can move the printhead horizontally and the platen vertically, either to an absolute location on the page or to a position relative to its current position. You can also issue half-linefeed commands for subscripting and superscripting.

Program mode commands allow you to control the printhead and hammer operations directly, specifying an ASCII character to be printed and the hammer force to be used in printing it. And graphics mode commands select either of two graphics modes. Both modes print 48 dots per inch, vertically. One of the modes prints 60 dots per inch horizontally, while the other prints 120 dots per inch horizontally. Two status commands allow the computer to send a status request to the

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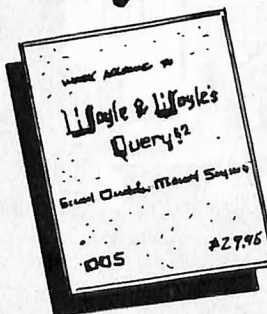
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"What the documentation does, it does well. It just doesn't do enough."

printer or reply to such a request from the printer.

In addition to such software control over printer operation, three banks of eight tiny DIP switches give you hardware control over a number of printer functions. You can use these switches, for example, to choose among standard options for character and line spacing, form length and automatic carriage return. They are also used to select protocol options such as baud rate, parity and handshaking. (Note that the LQP requires a serial interface card installed in your Apple.)

The documentation that comes with the LQP is very good—as far as it goes. Unfortunately, it doesn't go far enough. You get an operator's guide, reference card and a demo disk.

I recently tested another printer

whose documentation included an operator's guide, and I complained that it assumed that you already knew all there was to know about operating the printer.

Apple's operator's guide is quite the opposite. It is written clearly and assumes only that you know you have bought a printer to connect to your computer. In 23 pages, liberally illustrated with line drawings, it guides the novice through all the steps of printer hookup and initial testing.

The enclosed floppy disk is only a partly effective teacher. It does a

fine job of taking you through the basics, but it never gets to the advanced features. Here is what the disk tutorial covers:

- How to list programs to the printer.

- How to send commands to the printer from Basic or Pascal programs, using the example of shadow printing.

- It tells you that word processors capable of handling embedded printer control commands can make use of all the printer's features, and it refers you to the word processor's manual for further information.

- It tells you that the LQP operator's manual package contains a complete listing of command control codes (the Reference Card).

I've already described the many control codes detailed on the reference card. But the card is only a quick reference sheet, its information distilled down to the bare essentials. It is a memory jogger, not a tutorial or even a complete reference guide.

What the documentation does, it does well. It just doesn't do enough.

The limitation of the LQP's documentation, however, shouldn't overshadow the hardware itself. From my observations and use over the past couple of months, I would have no qualms recommending the LQP to anyone looking for a high quality printer. It has the well designed, solid, durable look you expect in return for such an investment, and it has not shown any defect in output quality during the time I have used it.

The LQP is manufactured by Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. Price is \$2195. ■

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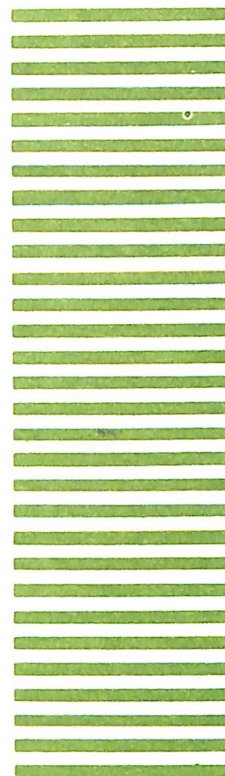
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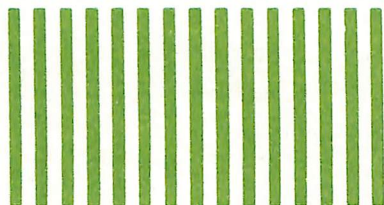
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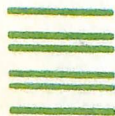


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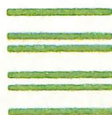


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ance? No—it's the cost of replacing printer ribbons.

I have an Epson MX-80 printer, the most popular printer in America for personal computers. When I bought it, I asked the salesman to sell me an extra ribbon. He asked, "What for?" Two weeks later, the ribbon was dry, and I was back in the store shelling out \$17.50 for a ribbon. It seemed rather expensive. I shopped around and found some by mail for \$13 and later even \$5.

These experiences led me to a two-year course of experimentation with printer ribbon re-inking. I finally worked out a system, but it was messy. No matter how careful I was, my fingers were ink stained for a week. But I got to be pretty good at it. I learned it was most efficient to re-ink five ribbons at once.

That's the way it was until 1983.

Then entered the Mac Inker, sold by SAS Industries, 3091 N. Bay Drive, North Bend, OR 97459, for \$30, plus another \$2 for ink. Does it work? Yes! Used as instructed by the manufacturer, it produced a good clean print on my ribbons.

The Mac Inker I bought was designed to fit the Epson ribbon cassette, but many other types of ribbons could be re-inked on it. You place the rollers on the posts. The cassette is placed over the motor and fitted into holes that hold it firmly in place. The ribbon is looped between the rollers. Ink is slowly applied to the felt rollers. Then start the motor and apply more ink occasionally as needed. It takes about 10 to 15 minutes to ink one ribbon. I suggest letting the ribbon run through the inker a few times to get the ink applied evenly.

The Mac Inker is very clean. In fact, I did not get a single drop of ink on my fingers or on the furniture. I recommend saving up your ribbons and re-inking four or five at a time. Wrap the re-inked ribbons in plastic wrap and put them back in the box until needed. I suggest buying about four bottles of ink. One bottle seems enough for about four ribbons. When you are done, carefully put the felt rollers in a plastic bag.

I have one criticism: The metal gear that engages the drive spindle in the cassette does not fit quite right. It may tend to chew down the plastic of the spindle with repeated use. This could be improved. But it is not bad. I estimate that you can extend the life of your ribbon 20 to 40 times with the Mac Inker. ■

John Tkach
Bozeman, MT

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ES-CAPE will help you develop, enter, and modify Applesoft programs. Even if you are only copying a program from a magazine, ES-CAPE will help you do it **three times faster!**

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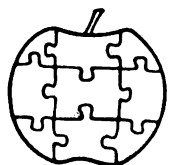
ES-CAPE is available now at many fine computer stores, or directly from S-C Software Corporation. The price is only \$60.

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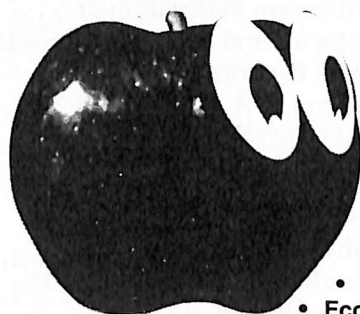


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- **Versatility** — Accepts either NTSC or industrial video input
- **Economy** — A professional tool priced for the hobbyist

The DS-65 is an intelligent peripheral card with on-board software in 2708 EPROM. Check these software features:

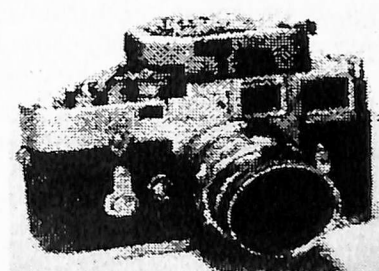
- Full screen scans directly to Apple Hi-Res screen
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Use the DS-65 for precision security systems; computer portraiture; robotics; fast to slow scan conversion; moving target indicators; reading UPC codes, musical scores and paper tape and more! **GIVE YOUR APPLE THE GIFT OF SIGHT!** DS-65 Price: \$349.95 / FSII Camera Price: \$299.00 / Combination Price: \$599.00

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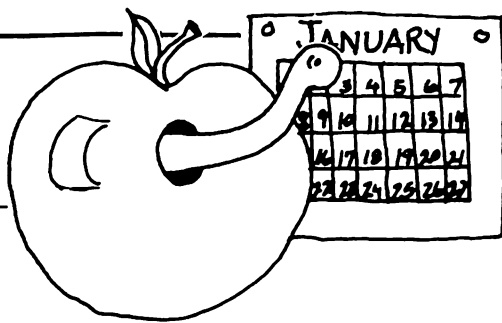


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Washington, DC 20036

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(703) 620-9840

January 25-28

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Elsa Glassman

CEC Dept. of Field Service

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(703) 620-3660

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contact:

Carol Houts

Judco Computer Expos

Suite 201

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Scottsdale, AZ 85257

(800) 528-2355

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Washington, DC

contact:

Louise Myerow

(617) 444-3946

February 2-4

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San Diego, CA

contact:

Gloria Rico

Society for Computer Simulations

PO Box 2228

La Jolla, CA 92038

(619) 459-3888

February 6-9

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Atlantic City, NJ

contact:

Dr. Joseph Urban

University of S.W. Louisiana

Box 44330

Lafayette, LA 70504

(318) 231-6304

February 7-10

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Conference

Orlando, FL

contact:

David Brittain

Florida Dept. of Education

Knott Bldg.

Tallahassee, FL 32301

(904) 487-3105

February 14

Introduction to Computers

Princeton, NJ

contact:

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Educational Testing Service

Princeton, NJ 08541

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February 14-16

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Silver Spring, MD 20901
(301) 589-8142

February 28–March 2
ACLD International Conference
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contact:
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ACLD
4156 Library Road
Pittsburgh, PA 15234
(412) 341-1515

February 29–March 3
Computers in the New Curriculum
Austin, TX
contact:
Vicki S. Smith
TCEA
PO Box 2573
Austin, TX 78768
(713) 462-7708

March 12–16
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Conference on Robotics**
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Robotics
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Silver Spring, MD 20901
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March 14–16
Simulation Symposium
Tampa, FL
contact:
R.M. Huhn
PO Box 37
Melbourne, FL 32901
(305) 727-6958

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an event important to Apple users, and would
like it listed in the inCider Calendar, please
drop us a line at Pine Street, Peterborough, NH
03458. Include the name of the event, the
date, the location, and the name of a contact
for further information.*

—the editors

March 15–16
**Literacy Plus +
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Tempe, AZ
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Arizona State University
Tempe, AZ 85281
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March 24–26
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March 26–28
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Tokyo, Japan
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The Interface Group
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Needham, MA 02194
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March 30–April 1
NY Personal Computer Show
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contact:
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Logo Talks Back, September

While I enjoyed the article "Logo Talks Back" in the September edition, I must point out an error in the CIRCLE procedure on page 48. The message I CAN'T DO THAT! will appear on the screen even if the operator makes a valid entry (BIG, MEDIUM, or SMALL). Clearly this is not the intent of the authors, and can be avoided by including the procedure name CIRCLE within the square brackets of the IF statements after the name of the type of circle to be drawn.

Eric P. Nagler
PO Box 2483

Santa Clara, CA 95055

Intruder, November

We have been alerted to an error in the Intruder listing on page 141 of our November issue. Line 3 should be changed from the gobbledygook that appears to RESTORE: SC=0.

—the editors

Modulating, November

Charles Crabbe, a reader from Edwards, CA, has pointed out an error in the schematic accompanying Tim Daniel's "Modulating" article in our November issue. On page 107, pin 4 on the Apple Auxiliary Video Connector should read +12V, and pin 3 should read -5V. Apparently the published schematic was based on page 97 of the old *Apple II Reference Manual*, rather than on the updated schematics found in the Addendum. We apologize for all those blown zener diodes.

—the editors

New Publications

edited by Joan Witham

Computer Encyclopedias

A series of personal computer encyclopedias, detailing hardware, peripherals, software, documentation and usage for nine computers (Apple included) is offered by The Book Company, 11223 South Hindry Ave., Los Angeles, CA 90045. Suggested retail price is \$19.95.

Cobol Coding Guide

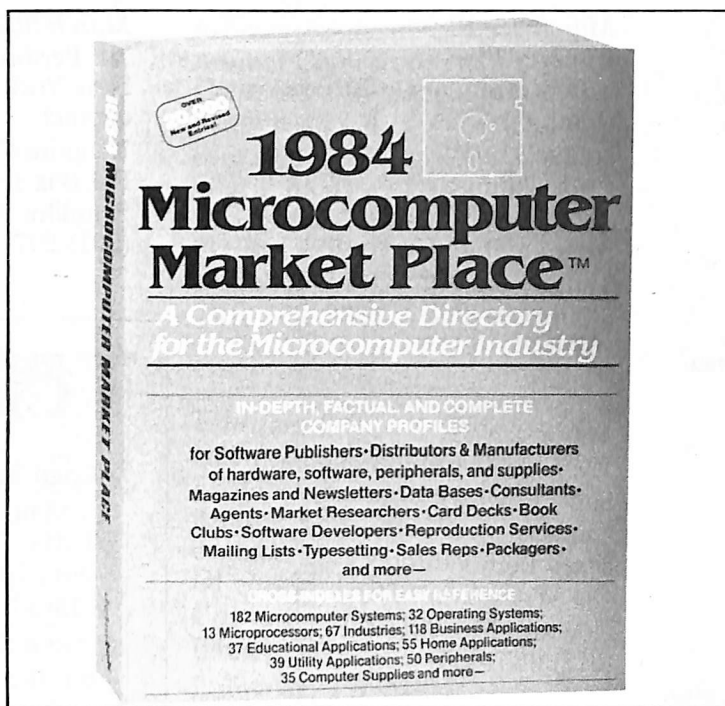
Business programmers or hobbyists can use the *Cobol Coding Guide*, a set of company standards and examples, to ensure that top-down programs are structured, testable and easily maintained. The guide sells for \$22 from Associated Technology Company, Box 448, Estill Springs, TN 37330.

Software Searches

Sofsearch Software Locator Service, PO Box 5276, San Antonio, TX 78201, provides custom search reports for subscribers from its database of over 30,000 computer software program products and 12,000 software producers. Sofsearch service fees range from \$40 to \$75 per search request.

Specialware Directory

The Specialware Directory from LINC, 1875 Morse Road, Suite 215, Columbus, OH 43229, is a source listing of companies that produce microcomputer courseware for special education. The price is \$13.95.



The Microcomputer Market Place

Company Survey

The Microcomputer Market Place contains over 10,000 microcomputer companies with in-depth company profiles given for over 2000 software publishers, 175 distributors, 300 magazines and newsletters and many more. A monthly calendar of industry meetings and exhibits is included. *The Microcomputer Market Place* is \$75 from Dekotek Inc., 2248 Broadway, New York, NY 10024.

Programmer's Market

To find where and how to submit your material, *The 1984 Programmer's Market* lists over 500 software publishers and magazines with information on whom to contact and where, submission requirements, royalty/payment terms, available contract work and tips from

buyers on selling software. The directory is available for \$16.95 from Writer's Digest Books, 9933 Alliance Road, Cincinnati, OH 45242.

Kid's Magazine

K-Power, a monthly computer magazine for teen and pre-teen computer enthusiasts, features coverage of computer-loving celebrity kids to close-ups of designers, programming languages, young pros and future technology. Subscription price is \$15.95 from Scholastic Inc., 730 Broadway, New York, NY 10003.

Administrator's Guide to Computers

The ERIC Clearinghouse on Educational Management, College of Education, Eugene, OR 97403, offers the *Administrator's Guide to Com-*

puters in the Classroom. Some features are hardware and software, management of individual learning programs, implementing computer literacy programs, overcoming computerphobia, and integrating computers into the existing instructional program. The cost is \$5.50 for this 53-page book.

Computer Literacy

Computer Literacy Activities for Elementary and Middle School Students is a collection of 12 introductory activities. It and two other booklets, *Logo in the Classroom* and *Computer Metaphors: Approaches to Computer Literacy*, are available for \$6 each from The International Council for Computers in Education, 1787 Agate St., University of Oregon, Eugene, OR 97403.

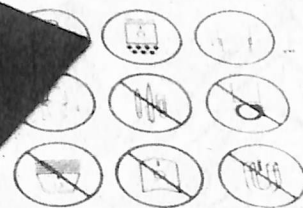
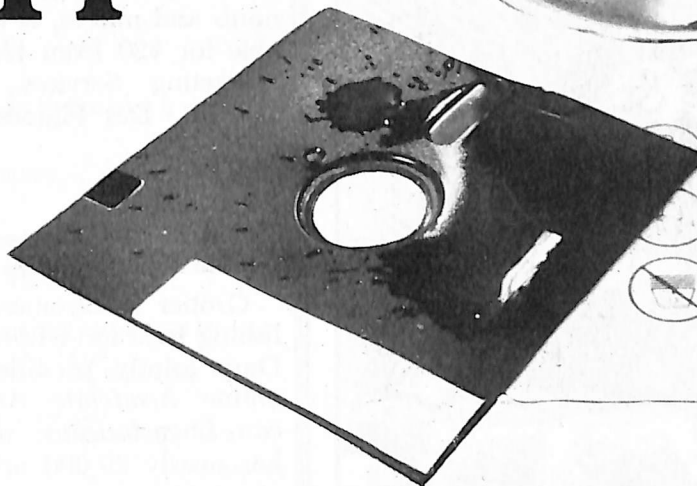
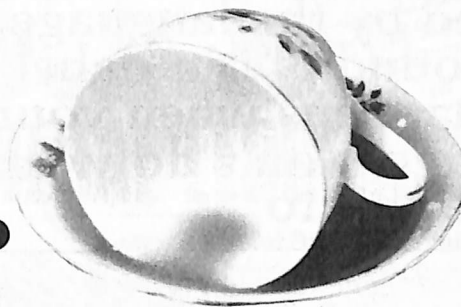
Is Your CRT Dangerous?

The second edition of *Health Hazards of CRT's* with 50% more citations is available from Ryan Research International, 1593 Filbert Ave., Chico, CA 95926. Both technical studies and reports from the popular and professional press are included in this updated bibliography. The price is \$4.95.

Software Survey

The 6th Annual Survey of Manufacturing Software, a comprehensive listing of software packages for automating the manufacturing planning process with a

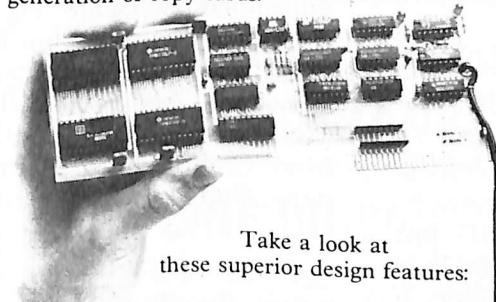
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comparative table of products from 113 vendors for minis and micros, is available for \$20 from Hunter Marketing Services, 950 Lee St., Des Plaines, IL 60016.

Online Encyclopedia

Grolier Electronic Publishing Inc. and BRS/After Dark jointly provide the online *Academic American Encyclopedia*, which has nearly 29,000 articles of contemporary and historical information, for home computer users. Contact BRS/After Dark, 1200 Rt. 7, Latham, NY 12110, for further information. The cost is a \$50 sign-up fee, a \$10 minimum monthly fee and a \$12-an-hour fee.

Directory of Investment Software

The American Association of Microcomputer Investors Inc. (AAMI) provides information on how to use microcomputers to do your investments. Membership benefits (\$49) include a subscription to the AAMI Journal, a comprehensive directory of investment software, free computer programs and discounts on investment software. Contact AAMI, PO Box 1384, Princeton, NJ 08542 for further information.

How to Sell Your Program

Over 159 companies are described in detail, with 800 additional companies listed, in the *Directory of*

Software Publishers: How and Where to Sell Your Program for \$25.50. Featured are financial arrangements, marketing agreements, copyrights, documentation and useful programming techniques. Contact Van Nostrand Reinhold, 135 West 50th St., New York, NY 10020 for further information.

Business Guide

Critic's Guide for the Apple provides complete information about business software programs—spreadsheets, data management and word processing, as well as programs for special business groups and for professional programmers developing their own software. In the appendices, software aids, computer games, hardware selection and other software are reviewed. The book retails for \$12.95 from Chilton Book Company, Radnor, PA 19089.

Information Index

BP Publications publishes the *Apple Index*, a subject guide to articles found in 12 magazines, cross-referenced by subject, application, name of hardware, software and manufacturer. Citations are given for page, issue and magazine titles with illustrations, charts, vendor lists, screen displays, program listings and much more. A subscription is \$22 for six issues or \$32 including the annual cumulation, from BP Publications, PO Box 617, Stiles Road, Southbury, CT 06488.

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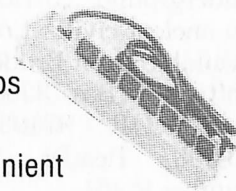
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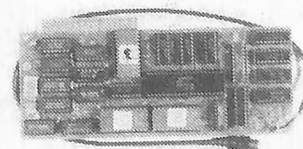
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New Software

edited by Joan Witham

Chivalry Is Alive

Chivalry, designed for the entire family, features 20 different games based on the days of chivalry—jousting tournaments and so forth. Disk, gameboard, playing pieces, poster, instructions, strategy hints and storage case are included in the \$49.95 price. Contact Xerox Educational Publications, 245 Long Hill Road, Middletown, CT 06457, for further information. Reader Service number is 450.

Drol Launched

Drol offers Apple gamers plenty to cope with—from airborne turkeys to overweight, hopping monsters, and on to scorpions, lizards, a magnet-tossing witch doctor and more. Your mission is to rescue two children who are drifting aimlessly through the underground corridors of an ancient civilization. It is available from Broderbund Software, Box 3266, Eugene, OR 97403, for \$34.95. Reader Service number is 451.

Enter Edu-Cave to Learn

Micro Program Designs, 5440 Crestline Road, Wilmington, DE 19808, introduces Edu-Cave, a two disk package of fun and learning for home or school use. You will wend your way up a treacherous mountain path and descend into the depths of multi-chambered Kurzen Cavern while answering challenging arithmetic, geography and spelling queries from the Wizard of Lore. Multi-

level challenges are offered as well as custom designing capabilities. The cost is \$29.50. Reader Service number is 452.

New Plato Courses

Control Data Corporation, under its Plato education software, has announced three computer courses to teach French, German and Spanish under "Create a Vocabulary" lessons. Instructors can

customize word lists by adding their own 250 vocabulary words or use the ones on the computer database. The programs each cost \$49.95.

Another program, Computer Concepts, consists of four courses—The Computer Keyboard, Storage and Memory, Files and Editing and Databases—that are designed to teach the fundamentals of computer concepts. Cost is \$49.95. Contact Control

Data Corporation, La Jolla, CA, for further information. Reader Service number is 453.

Save a Doomed Planet

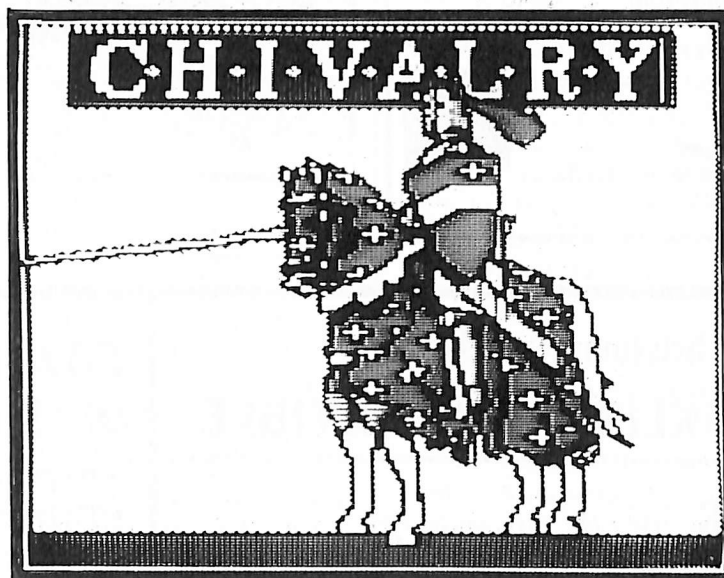
Planetfall, Infocom's interactive prose adventure game, features a game disk, eight-page Stellar Patrol manual, a Stellar Patrol ID badge, a six-page space diary and a series of four-color postcards in a portfolio-type package for \$49.95. You and your robot, Floyd, shipwrecked on a doomed and plague-ridden planet, are challenged to save this alien world during your 10-day stay. Contact Infocom Inc., 55 Wheeler St., Cambridge, MA 02138, for further information. Reader Service number is 454.

Memory Reminder

Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601, has released Magic Memory, a directory/database system that is made especially for the first-time computer user. Names, addresses and phone numbers can be stored, deleted and transferred in a wink of an eye. Suggested retail price is \$99.95. Reader Service number is 456.

CustomFont for Apple III

Apple III word processing, spreadsheets and user programs can be enhanced with custom characters, special symbols, business logos and fonts created by CustomFont. Features are built-in file utilities and a



Chivalry



Planetfall



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Diabolical Plot of Dr. Dracupig

The Diabolical Plot of Dr. Dracupig is a fast-paced arcade game where you try to destroy snapping jaws, tumbling bones, breathing lungs and other animated body parts with your limited supply of Vampire Venom. Cost is \$29.95 from Vulcan Software, 1805 Saulter Road, Birmingham, AL 35209. Reader Service number is 455.

Scientific Graphing

The PlotPro package is a generic plotting package consisting of three Micro-

soft Basic programs—Plot-Pro, ProTemp and Pro-Quick—that make scientific graphs on any 80- or 132-column printer. The package is available for \$49.95 for the Apple II Plus with CP/M. Contact BV Engineering, PO Box 3351, Riverside, CA 92519, for further information. Reader Service number is 458.

Triple Arcade Insanity

Triple Arcade Insanity contains three complete arcade-style games—Alien Onslaught, Galactic Conquerors and Andromeda Blitz—each multi-leveled and harder than the previous game, for \$29.95. Contact Avant-Garde Creations, PO Box 30160, Eugene, OR 97403, for further information. Reader Service number is 459.

Algebra Addition

Microcomputer Workshops Corp., 225 Westchester Ave., Port Chester, NY 10573, announces an addition to its Algebra series of four programs:

Binomial Multiplication (\$24.95), Factoring Algebraic Expressions (\$29.95), Simultaneous Linear Equations (\$29.95) and Graphing Linear Functions (\$29.95). The programs are highly interactive. They use the screen as a worksheet, contain tutorials and explanatory error messages and follow the procedures as they are taught in the mathematics classroom. Reader Service number is 460.

You're All Heart

Heartbeat/Heartwork/Heartflow is a program designed for science or health students, health care institutions and individuals who want to learn more about the workings of the heart. Featured are a graphic animation of the exterior of a life-sized beating heart and a changing cross section with a moving blood flow indicator. It is available from J & S Software, 140 Reid Ave., Port Washington, NY 11050 for \$39.95. Reader Service number is 461.

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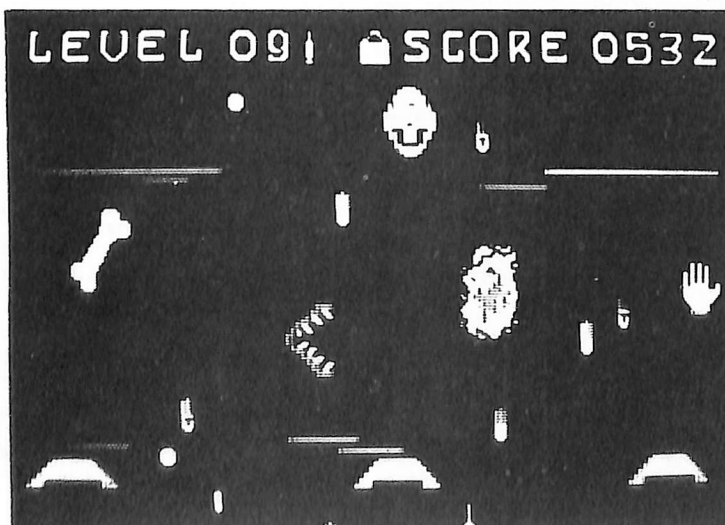
Color Me, a computer "coloring book" with 25 Hi-Res pictures of familiar objects and animals, is designed with multiple levels of difficulty for children from 3 to 12. Each picture is titled in large capital letters for word recognition and can be colored with joystick or paddles using any of 32 color pots. Suggested retail price is \$29.95 from Versa Computing, 3541 Old Conejo Road, Suite 104, Newbury Park, CA 91320. Reader Service number is 462.

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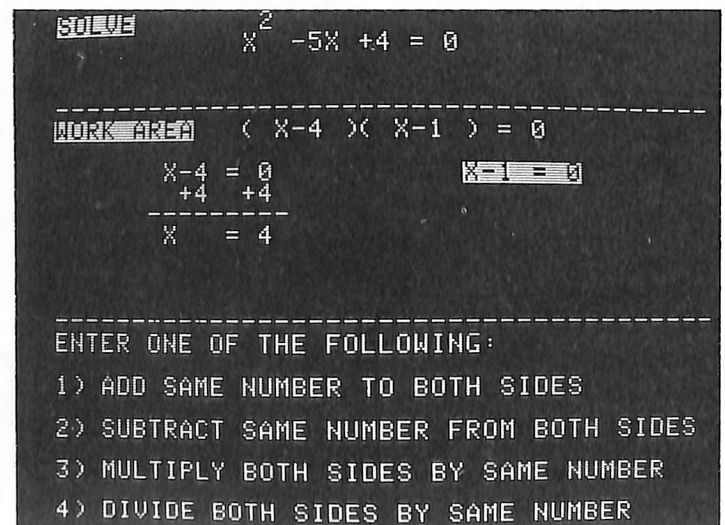
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Commands 8 & 9 in Hidos only.

10K More Memory

These nine commands operate identical to existing DOS commands. Use A or A\$ for address and L or L\$ for length. Enter new commands on the Keyboard and use them in Basic programs with the familiar D\$. Use HIDOS in Hello program for turnkey startup, adding 10K free memory.

Variable Speed Scrolling

TLIST, DUMP, and DISA Features are:

1. Print with PR#.
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All DOS entry addresses have been preserved. DOS is Same length and compatible with most software. David-Dos is copyable and creates fully copyable updated disks. Init areas were used for David-Dos. Works with all Apple IIs including IIe 80 Col. Requires 48K. Complete documentation for screen or printing and many utilities are on the disk.

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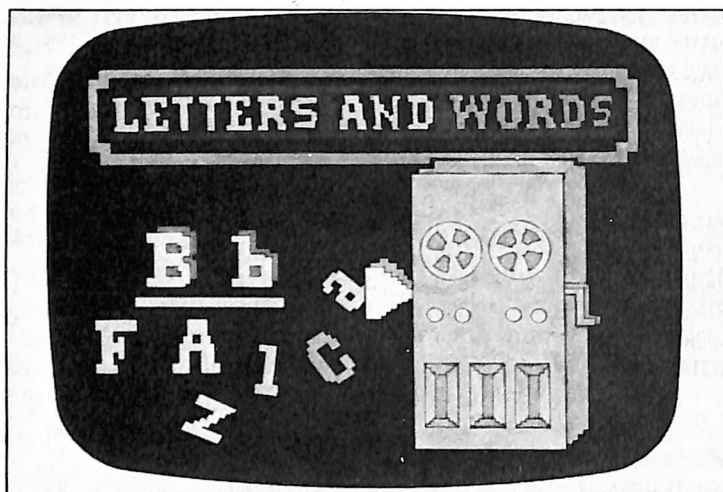
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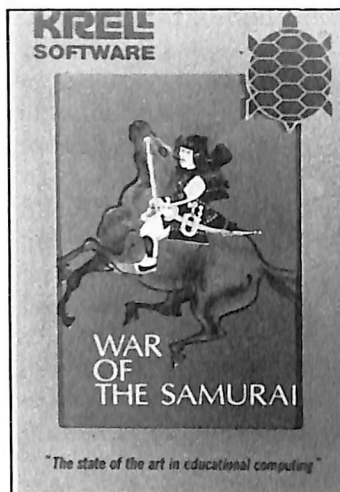


Letters and Words from Learning Well

with detailed instructions for ages 12 through adult, generates its own almanac data. It prints out the projected locations of 57 of the most prominent stars from now until the year 2000 from any location on Earth. A star identification program is also included with the software, instructions, astrolabe, compass and book (*The Stars* by H.A. Rey) for \$59.95. Contact Celestial Software, 3010 Warrington Ave., Lakeland, FL 33803, for further information. Reader Service number is 467.

Accounting for Expense Accounts

Expense Accounts Manager organizes and tracks travel and entertainment expenses for the company executive or individual professional. Specific features are easy entry and corrections, reminders of expenses often overlooked, subtotals, automatic reconciling of travel advances and tracking of reimbursements; the system interfaces with VisiCalc to allow ad-hoc reporting of the expense data. Suggested re-



War of the Samurai

tail price is \$150 from Adaptive Software, 1868 Cavell Ave., Highland Park, IL 60035. Reader Service number is 464.

Project Management Made Easy

Project Management features four programs containing Critical Path Analysis, Program Analysis and Review Technique (PERT), Resource Allocation and Activity-On-Arrow Analysis from Industrial Engineering and Management Press, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, GA 30092. The cost is \$175 for all four programs or \$140 for IEE members. Other programs available, besides Project Management are Word Measurement, Forecasting, Economic Analysis Revision and Production Control for the same price. Reader Service number is 465.

Learning Well

Knowing Numbers, Letters and Words and Body Awareness are three re-

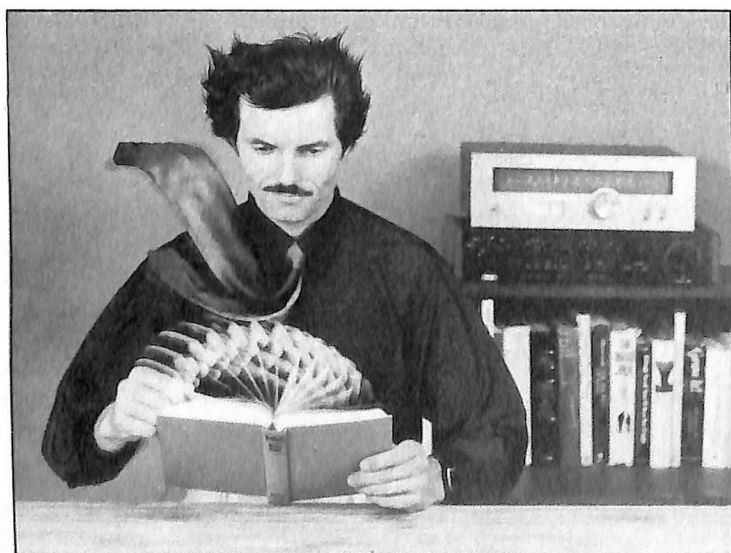
leases from Learning Well, 200 South Service Road, Roslyn Heights, NY 11577. Designed to be fun, colorful and comprehensive learning experiences, this educational software is played by using the space bar. Each program is \$49.95. Reader Service number is 466.

Samurai Strategies

War of the Samurai, a strategic game of combat and intrigue, is a combination of Chess and Go. Features include opportunities for negotiation, alliance building and double-cross as well as mobility and probabilistic rules of capture. Cost is \$39.98. Contact Krell Software Corp., 1320 Stony Brook Road, Stony Brook, NY 11790, for further information. Reader Service number is 468.

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With Super Speed Reading, you will learn to increase your reading speed up to 10 times so you can zip through novels, magazines and all regular reading. SSR features graphics and upper/lowercase, keeps user records automatically and displays individual progress charts. The program includes 10,000 word-per-minute Flash Practice and 120 on-screen story pages for students, executives and the computer programmer. Two disks and a 130-page instruction manual are offered for \$140 from Magnum Software, 21115 Devonshire St., Suite 337, Chatsworth, CA 91311. Reader Service number is 469.



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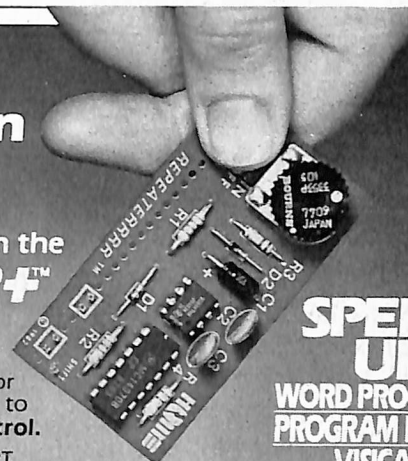
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Cost is \$13,725, which includes the operating system, network processing, 512K RAM, six workstations, a 20 megabyte disk driver, reference manual and more. For further information, contact Novell Data Systems, 1170 N. Industrial Park Drive, Orem, UT 84057. Reader Service number is 470.

Pixel Packing Power

Visual Data Enterprises, PO Box 30563, Los Angeles, CA 90030, introduces the Number Nine Graphics System, a hardware/software package that provides computer graphics capabilities by upgrading the color, resolution and drawing speed of the micro to that of more expensive systems. Suitable for design, business, scientific or educational applications, the software features interactive menu-driven graphics that require no previous programming experience.

Suggested retail price for the software is \$95-\$245; the graphics board featur-



Upgrade your graphics with Number Nine Graphics System.

ing 512-by-512 resolution with 16 colors is \$895. Reader Service number is 471.

ShuffleBuffer Shuffles Text

Interactive Structures Inc. has unveiled ShuffleBuffer, a printing buffer that "shuffles" text, graphics, spreadsheet information and other computer-generated material into any desired combination for printing, plotting or telephone transmission. Applications include mailing lists, letter mergings,

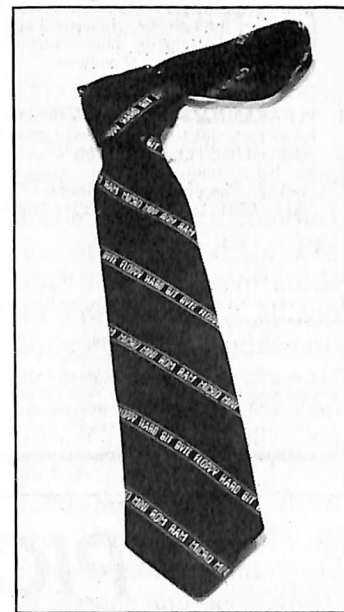
preparation of personalized form letters and so forth.

It comes with its own cables, power source and user's manual for \$299 for 32K; \$349 for 64K and \$445 for 128K. Contact Interactive Structures Inc., 146 Montgomery Ave., Bala Cynwyd, PA 19004 for further information. Reader Service number is 472.

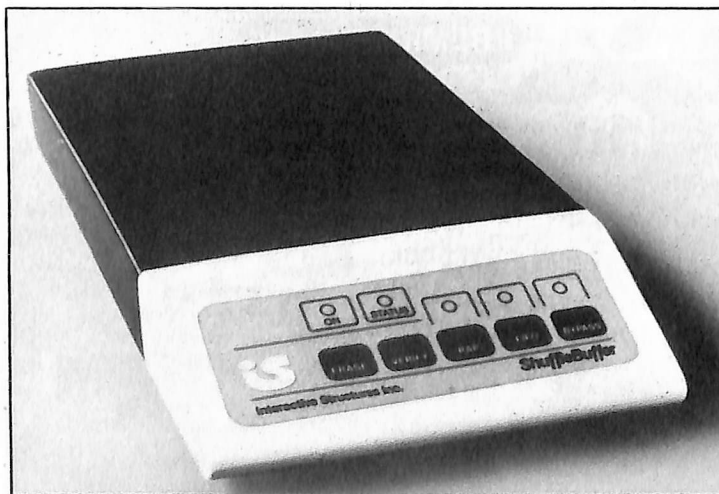
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Vitamill Adds More Juice

Stellation Two, PO Box 2342, Santa Barbara, CA 93120, now has a more powerful model than The Mill—Vitamill. Vitamill, a second generation 6809 board, includes 64K of RAM memory that runs Invisible Optimizer, the new system software that increases the speed of I/O delivery from 1-5 times faster.

Vitamill/Invisible Optimizer currently works under Apple Pascal, Fortran, and the Apple 48K Runtime Environment. Applications that work under this new speedup system are PFS, Incredible Jack, Senior Analyst, Apple Graphics from Apple Computer and State of the

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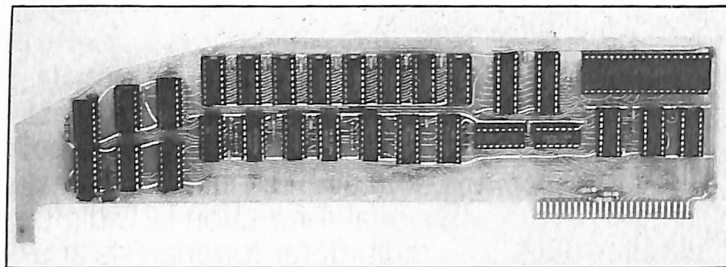
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Do You Need PUPS?

The PUPS (Portable Uninterruptible Power System) Model AC is a solid state portable self-contained, uninterruptible power system that ensures that computer operations are not affected by utility gaps, spikes, surges, noise, brownouts or complete outages. It is available only through computer dealers for \$495. Contact BITS Power Systems Inc., 11020 Audelia Road, Suite B114, Dallas, TX 75243 for further information. Reader Service number is 476.

Woodtec Printer/Monitor Stands

Woodtec announces a series of hardwood veneered, all-wood monitor and printer stands for both letter-size printers and the wide-carriage printers. Ready-to-use desktop units are available in walnut, teak or oak finish stains. Prices start at \$38.95. For further information, contact Woodtec, 320 W. Maple, Box 445, Arkansas City, KS 67005. Reader Service number is 480.

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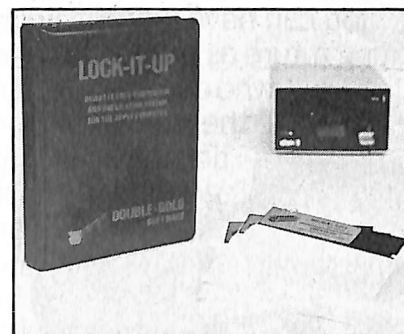
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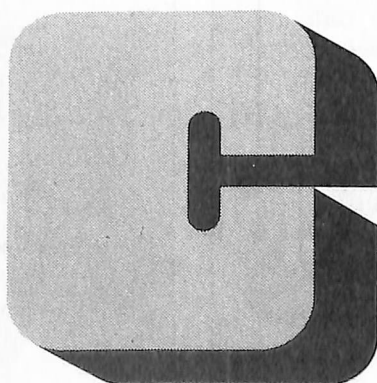
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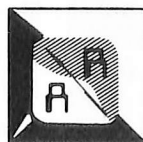
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Paragraph-I

Paragraph-I, a parallel graphic printer interface card for the Apple II, II Plus, IIe, and Apple look-alikes, performs graphic functions of 90 degree image rotation, double size and inverse print. The card is Centronics compatible and can be used with Apple Logo, Pascal, Applesoft Basic and CP/M. Firmware for the Epson, Gemini, Panasonic, C. Itoh, NEC and Apple dot matrix printers is also available. Suggested retail cost is \$139

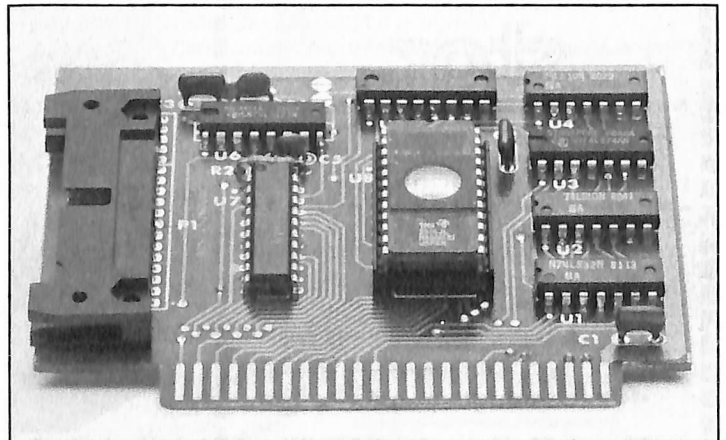
from Techport Inc., 8120 Penn Ave. South, Suite 114, Minneapolis, MN 55431. Reader Service number is 447.

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The Model DP-10, a large print display processor, plugs into the Apple II, II Plus and IIe. It enlarges the displayed letters up to 16 times their original size to be viewed clearly by the visually impaired. A special User Control Panel provides joystick-type control to access portions of the screen for enlargement. No extra software is required. The price of the basic peripheral device is \$2495. Contact Visualtek for more information at 1610 26th St., Santa Monica, CA 90404. Reader Service number is 482.

Scorpion Robot

The Scorpion, resembling a lunar explorer, is designed for the serious computer hobbyist for \$660. It is completely software programmable, can see, make noises and move along the ground to bring a newspaper, mail or food. The Scorpion follows in-



Paragraph-I graphic printer interface.

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Micromodem II.....	379.00	270.95
Micromodem II W/Term Prog.....	409.00	298.65
Mockingboard I.....	179.00	152.00
NEC 1201 Green Monitor.....	285.00	166.15
NEC 1212 Color Monitor.....	399.00	310.00
NEC 1260 Green Monitor.....	149.95	113.50
NEC PC8023 Printer.....	599.00	441.85
NEC PC8025 Printer.....	975.00	825.00
Parallel Card W/Cable.....	99.00	56.55
PI-2 12 in Green Monitor.....	210.00	154.55
PI-3 12 in Amber Monitor.....	249.00	162.00
PI-4 9 in Amber Monitor.....	199.00	144.50
Pkaso Interface.....	175.00	132.60
Prowriter 1550 Printer.....	995.00	750.00
Prowriter 8510 Printer.....	595.00	500.00
Ramcard - 16K (Microsoft).....	99.95	75.00
Ramcard - 16K (MPC).....	99.00	60.25
Ramcard - 16K (Prometheus).....	99.00	56.55
Ramex 128.....	499.00	366.80
Sanyo 8112 12 in Green Mon.....	260.00	204.60
Saturn 128K Ram Board.....	499.00	382.60
Saturn 64K/80 COL-IIIE.....	249.00	207.30
Saturn Accelerator II.....	599.00	441.10
Select-A-Port.....	59.95	45.80
Serial Interface W/Cable.....	149.00	131.95
Smarterm 2.....	179.00	134.45
Smarterm Standard.....	345.00	271.15
Soft Video Switch.....	35.00	26.85
Softcard.....	345.00	253.00
Softcard - IIE.....	495.00	350.35
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SSM Apple Modem Card.....	325.00	262.75
SSM Transpak-2.....	448.00	375.70
Starwriter F10-40PU Printer.....	1,895.00	1,562.50
Sup'r Mod - Universal.....	69.95	53.05
Sup'rterm 80 Col. Board.....	349.95	260.00
System Saver.....	89.95	70.75
Taxan 12 in Amber Monitor.....	189.00	138.65
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TG Track Ball.....	64.95	46.00
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Versacard.....	199.00	157.00
Videoterm Board.....	279.00	213.35

Videoterm W/SS & Inverse.....	319.00	247.05
Wildcard.....	139.00	104.85
Wizard 80 Col. Board.....	249.00	169.75
Wizard-16 (16K Ram).....	95.00	62.85

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Alien Addition (Home).....	29.95	23.95
Bumble Games.....	39.95	28.30
Bumble Plot.....	39.95	28.30
CDEX - How to use the IIE.....	59.95	43.35
Compu-Math/Arith. Skills.....	49.95	34.50
Compu-Spell System.....	29.95	20.70
Delta Drawing.....	59.95	43.00
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Gertrude's Secrets.....	44.95	31.85
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How to Pgrm in Applesoft.....	49.95	35.35
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Rocky's Boots.....	49.95	35.35
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Bank Street Writer.....	69.95	48.35
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Format II Enhanced.....	150.00	108.50
Letter Perfect.....	149.95	103.60
Magic Window 2.....	150.00	109.25
Pie Writer 2.2 (40/80).....	149.95	106.15
Screenwriter II.....	129.95	89.00
Screenwriter Professional.....	199.95	138.25
Sensible Speller IV.....	125.00	86.50
Supertext Pro (Special).....	99.00	70.10
The Dictionary.....	99.95	69.00

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Apple Mechanic.....	29.50	20.35
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EZ Draw 3.3.....	49.95	35.35
Frame-Up.....	29.50	20.35
Graphics Magician.....	59.95	41.40
Hi-Res Secrets.....	125.00	86.35
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Special Effects.....	39.95	27.60
The Artist.....	79.95	55.25
Typefaces.....	20.00	13.85
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Bag of Tricks.....	39.95	28.30
Copy II Plus.....	39.95	25.65
Data Capture IIE.....	90.00	63.70
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Locksmith.....	99.95	68.50
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Utility City.....	29.50	20.35
Videoterm Utilities Disk.....	37.00	26.20
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Viscalc 80/Memory Expand.....	89.00	64.40

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Epson MX-80 Ribbon 2-Pac.....	28.00	12.55
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Head Cleaning Kit.....	29.95	17.70
Maxell MD1 Disks (10 Pack).....	51.90	29.40
NEC 8023 Ribbon 2-Pac.....	19.95	17.10
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Verbatim MD 525 Hard Pack.....	35.00	27.60

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DB Master Version 4.....	350.00	247.70
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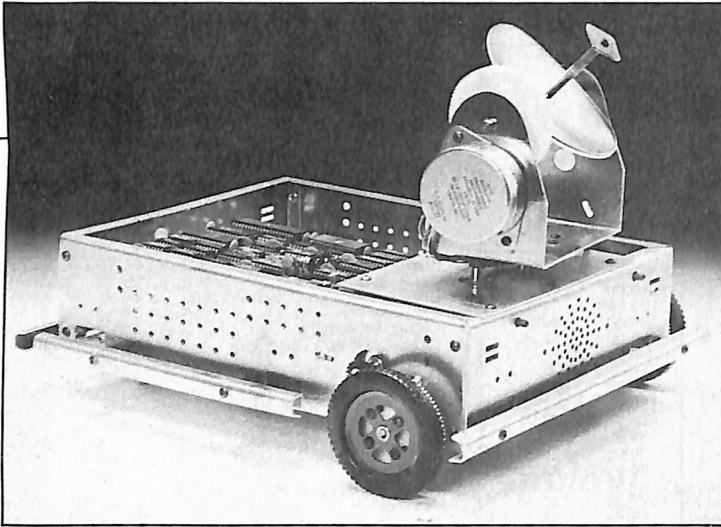
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800-233-3237



This ad prepared August, 1983



The Scorpion obeys your commands.

structions and answers questions sent from an Apple, connected by an RS-232C serial interface. For further information, contact Rhino Robots Inc., PO Box 4010, Champaign, IL 61820. Reader Service number is 479.

OnTime Project Management System

The OnTime system uses critical path techniques (PERT) for planning, tracking and maintaining schedules with as many as 250 tasks for applications

ranging from constructing a home to planning an advertising campaign. The system also estimates initial task cost and analyzes the allocation of your resources. OnTime requires an Apple

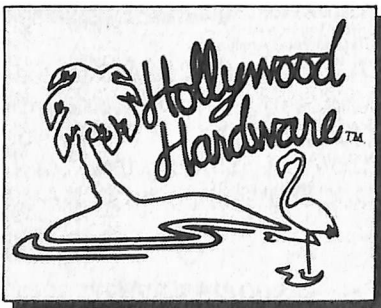
II, a II Plus or a IIe with two disk drives and a printer.

The \$275 price includes two copyable system disks, a project example data disk and a system reference



Never be late with the OnTime Management System.

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SOFTWARE ENHANCEMENT SYSTEM, APB-102 \$189.00
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25 BUFFERED LINES IN W/FILTERING, 23 BUFFERED LINES OUT, INTERRUPT INPUT, 4 TIMERS

#1 SELLER AT A.P.P.L.E.*

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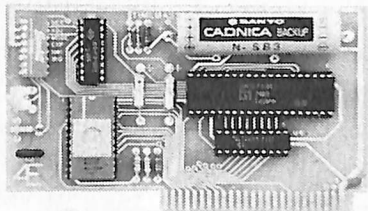
USE OUR 60 DAY UNCONDITIONAL MONEY BACK TRIAL. IF YOU CAN PART WITH IT—WE'LL BUY IT BACK! ASK ABOUT DEALER/USER GROUP DISCOUNTS!

APPLIED ENGINEERING Quality Starts On The Drawing Board....

But it doesn't end there. Our commitment to excellence applies all the way down the line, through manufacturing and testing to our three year no-hassle warranty. The aim, of course, is to provide you with the best designed and best crafted hardware available. Try any of the peripherals below and see what it's like to own the finest.

The TIMEMASTER Finally, a clock that does it ALL!

Automatically date stamps files with PRO-DOS



Fully PRO-DOS compatible

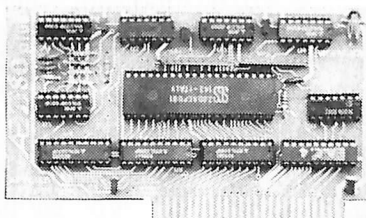
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- A rechargeable NiCad battery will keep the TIMEMASTER running for over ten years.
- Powerful 2K ROM driver — No clock could be easier to use.
- Full emulation of most other clocks, including Mountain Hardware's Appleclock (but you'll like the TIMEMASTER mode better).
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER includes 2 disks with some really fantastic time oriented programs (over 25) plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a \$200.00 value alone — we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER.

If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER.

PRICE \$129.00

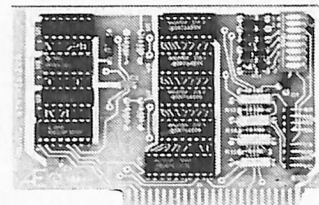
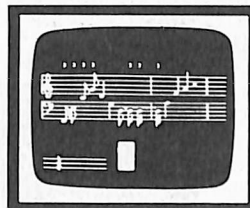
Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
 - The only Z-80 card with a special 2K "CP/M detector" chip.
 - Fully compatible with microsoft disks (no pre-boot required).
 - Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
 - Red "CP/M WORKING" LED indicator, the Z-80 Plus does not interfere with non-CP/M programs.
 - A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHz.)
 - Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.
- Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE \$139.00

Super Music Synthesizer Improved Hardware and Software



- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

PRICE \$159.00

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections on the card are made with standard video connectors.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTWARE	SHIFT KEY SUPPORT	LOW POWER DESIGN	THREE YEAR WARRANTY	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	169	YES	YES	YES	YES	YES	YES	YES	YES
SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE \$169.00

- Expands your Apple IIe to 128K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands VisiCalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.

MemoryMaster IIe 128K RAM Card

- Lowest power consuming 128K card AVAILABLE.
- Complete documentation included, we show you how to use all 128K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster IIe with 128K	\$249
Upgradeable MemoryMaster IIe with 64K	\$169
Non-Upgradeable MemoryMaster IIe with 64K	\$149

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in the APPLE IIe, II, II+ and Franklin. The MemoryMaster IIe is IIe only. Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY**.

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card. A user's manual is also available for \$35. Contact InfoTool Corp., Drawer 809-V, Poulsbo, WA 98370, for further information. Reader Service number is 483.

Cool + Time

Extend the life expectancy of your computer by removing heated air from inside your Apple and exhausting it to the rear. The unit features separately switched rear power outlets controlled by two lighted front-panel switches to provide convenient control of the Apple, printer and monitor. It also protects the entire system with transient power-spike suppression circuitry. The real-time and elapsed-time clock/timer displays real time as well as allowing tracking of time spent on databases. The unit sells for an introductory price of \$89.95 from Tencal Inc., 9525 De Sota Ave., Chatsworth, CA 91311. Reader Service number is 484.



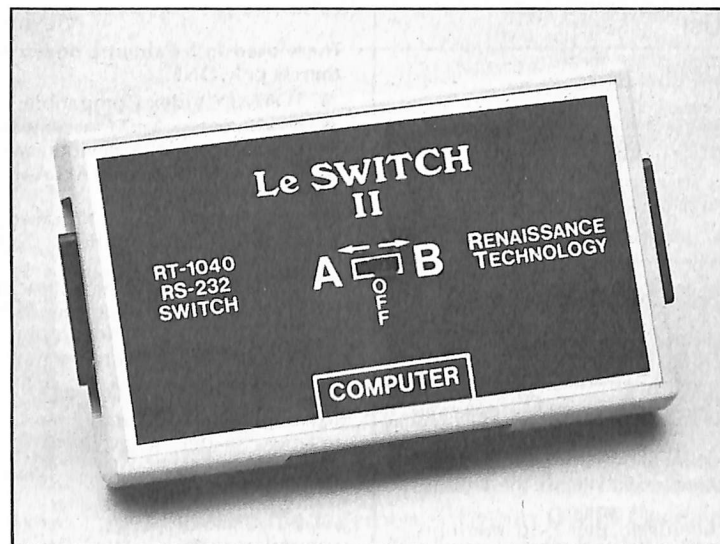
Computer Cooler.

VideoSlide35

Once the VideoSlide35 is interfaced (with no special driver software needed) to the Apple and standard



Make color slides with the VideoSlide35.



LeSwitch is doubly efficient.

35mm film is loaded into the system camera, the user can obtain color slides of the computer monitor image for as low as 50 cents per slide. The VideoSlide35 camera unit retails for \$2599 with interface cables extra. For further information, contact Lang Systems Inc., 1010 O'Brien Drive, Menlo Park, CA 94025. Reader Service number is 485.

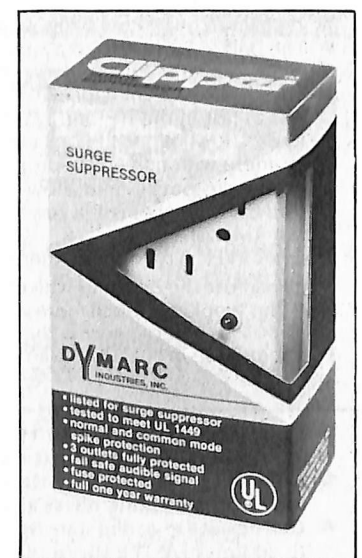
Switch to Le Switch

Two printers can run from the same computer with Renaissance Technology's Le Switch. Le Switch permits word processing and editing to be done on a high speed dot-matrix printer, then switched to a letter-quality printer for the final document—all done with one easy hook-up. Le Switch I (for paral-

lel printers) retails for \$125, and Le Switch II (for serial printers) retails for \$125. Both are available from computer dealers or from Renaissance Technology Corp., 1045 Detroit Ave., Concord, CA 94518. Reader Service number is 486.

Clipper Protects from Spikes

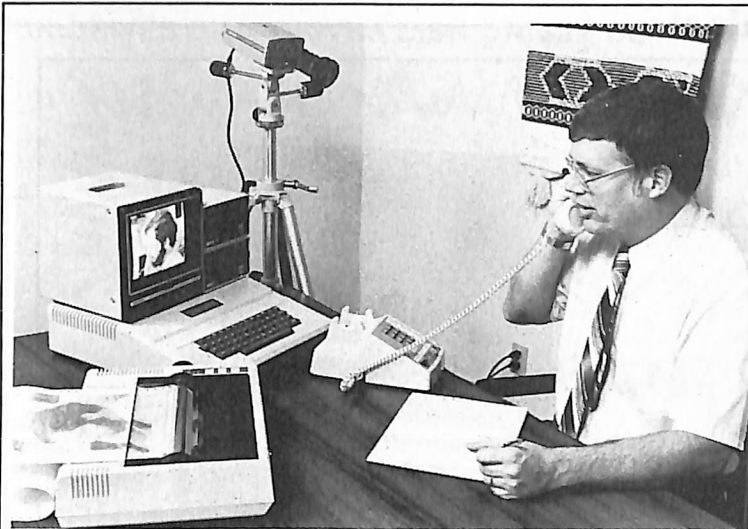
Dymarc's Clipper protects computers from dangerous electrical spikes of 6000 volts or more. Easily plugged into any three-pronged socket, the unit provides three outlets of protected power. The Clipper also features a fail-safe beeper and an LED to indicate when it is not operating properly. Suggested retail price is \$49.95 from Dymarc Industries, 21 Governor's Ct., Baltimore, MD 21207. Reader Service number is 488.



Clipper surge suppressor.

Interface a Typewriter

The AR-180 provides both an RS-232C serial and Centronics parallel inter-



PhotoCaster...a new feature packed system to take, process, store, print, send and receive color and black-and-white photos with your Apple II computer.

PC-100 (disk software, I/O board, manual, demo tape)\$499.95

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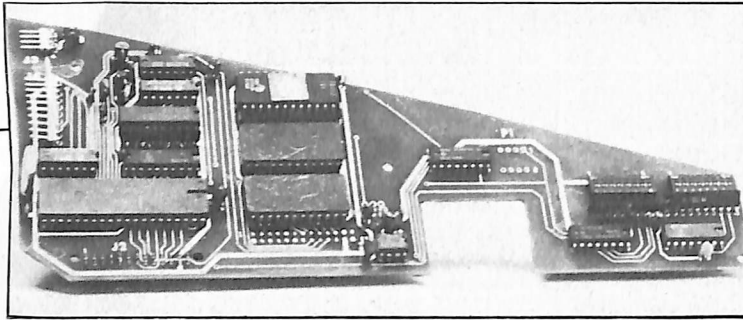
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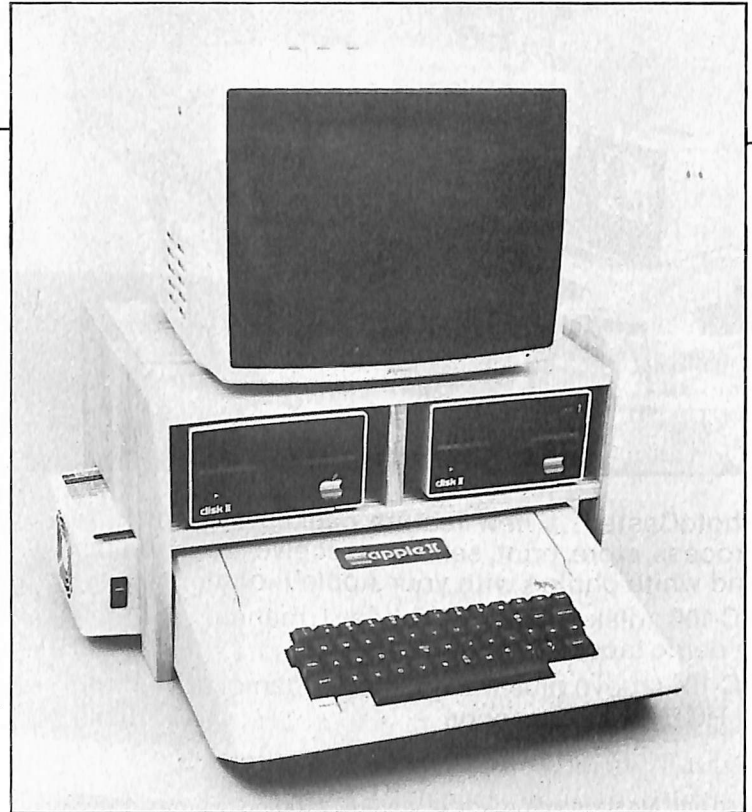
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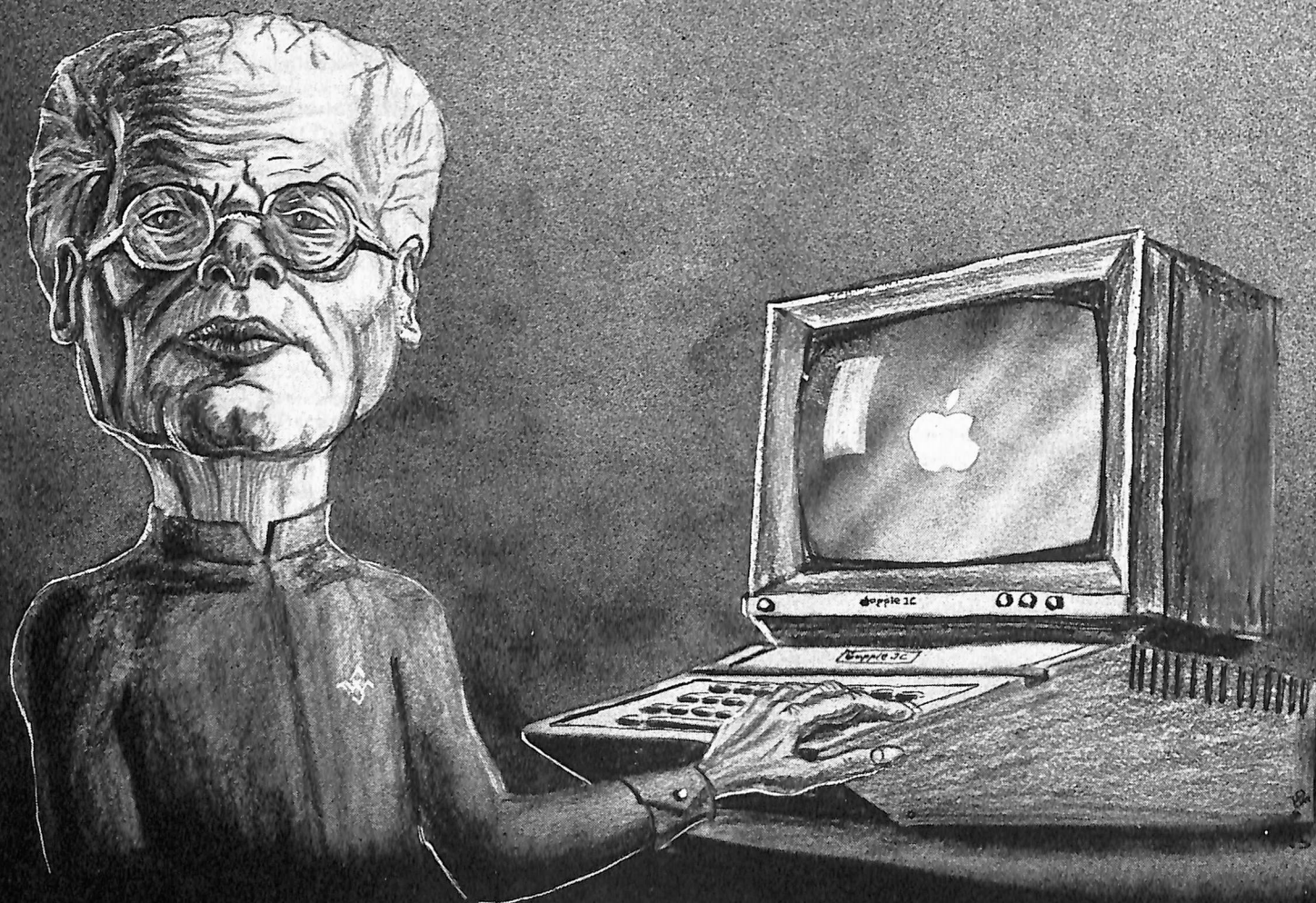
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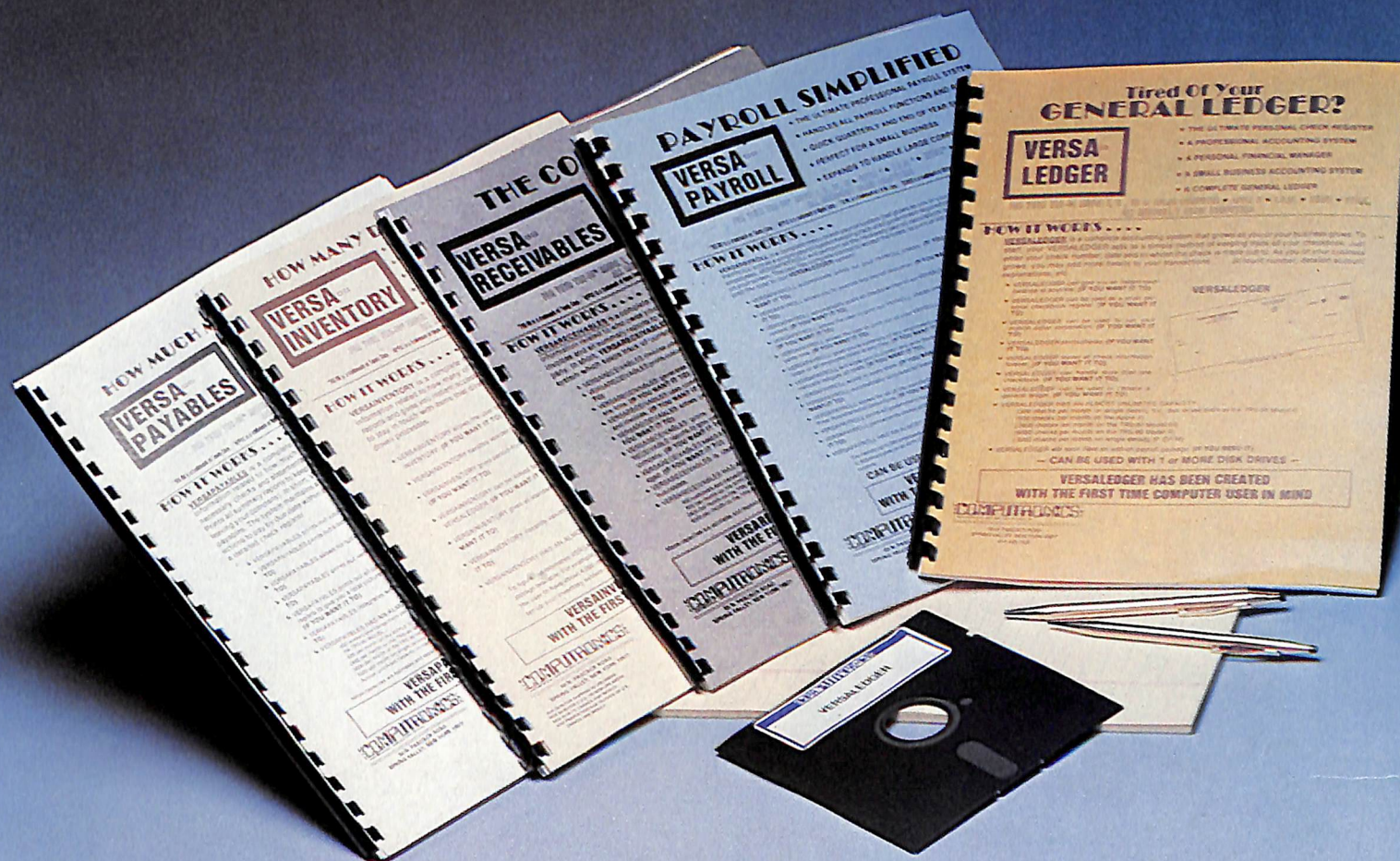
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